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| Date. | From. | Subject. | |
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| 19 October 1878 - | Capt. Clayton Beauchamp, R.E., Under Secretary to Government North-Western Provinces and Oudh, Public Works Department. | Wells as a protection against famine from the point of view of the Public Works Department, with Appendix. | 1 |
| 1 May 1879 - | Sir A. Clarke - - | On the proposals of the North-Western Provinces Government to construct, at the expense of the State, permanent wells for irrigation. | 1 |
| | | Report of the Committee appointed under the Famine Commission to inquire into the management of irrigation works in Madras, Orissa, and Midnapur; together with a supplement on the irrigation system of the Soane Canals, Behar; and Appendices. | |

PREFACE.—INSTRUCTIONS TO THE COMMITTEE.

CHAPTER I.—General description of the Government irrigation works of Madras - - - - - 1
II.—The state of irrigation in the zamindáris or estates of private landholders, and the expediency of Government interfering for its improvement. 1
III.—The principles to be followed in defining the respective duties of officers of the Revenue and Public Works Departments in the administration of irrigation works. 1
IV.—How far the maintenance of irrigation works should be defrayed by public funds, how far it should devolve on those who directly benefit by them, and the possibility of reviving the ancient system of *Khudi Maramat*, or the execution of petty repairs to works by the unpaid labour of the people depending on them. 1
V.—The direction which should be taken in improving and extending irrigation works in Madras - - 1
VI.—The sufficiency of existing legislation in Madras for the proper administration of its irrigation works, and the treatment of vested rights in water. 1
VII.—The combination of navigation with irrigation - - - - - - - - 1
VIII.—The state of the affairs of the Madras Irrigation Company, and the best means of improving them - - 1
IX.—The present condition and the future prospects of irrigation works in Orissa - - - - 1
X.—Irrigation works in Midnapur - - - - - - - - - - 1
*Supplement.*—The Irrigation System of the Soane Canals in Behar - - - - - - - - 1

Appendix A.—A bill for the regulation and enforcement of Khudimaramat, in the Presidency of Madras - - - 1
Appendix B.—Instructions for dealing with applications for remission of land and water tax in the Godavari district - 1
Appendix C.—Note by Major Scott Moncrieff, on the administration of canal administration - - - - 1

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| 8 March 1879 - | Mr. C. A. Elliott, Secretary to the Famine Commission to the Government of India. | Summarising the suggestions contained in the Report of the Irrigation Committee, suggesting that the views of the local governments thereon should be obtained. | 1 |
| 7 May 1879 - | Secretary to Government Punjab to Government of India. | Forwarding a Minute by the Lieutenant-Governor, Punjab, on the administration of canal irrigation. | 1 |
| 2 May 1879 - | Secretary to Government North-Western Provinces, Public Works Department, to Secretary to Government North-Western Provinces and Oudh, Revenue Department. | Colonel Brownlow's views as to the administration of canal irrigation, with reference to Major Moncrieff's note. | 1 |
| 21 May 1879 - | Secretary to Government of Bengal, Public Works Department. | Forwarding a memorandum on the Report of the Committee appointed to visit and examine the irrigation works in Beng With Appendices. | 1 |

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# APPENDIX V.

## IRRIGATION AS A PROTECTION AGAINST FAMINE.

### CULAR MEMORANDUM BY THE FAMINE COMMISSION, INVITING INFORMATION REGARDING IRRIGATION WORKS.

ope of the Commission's enquiries as regards is defined in paragraphs 12–16 of the Secretary despatch, dated 10th January 1878, and in ns 11–12 of the Government of India's Resolu- ed 2nd May 1878. In these instructions the sion is required to record its views as to—

he area now irrigated or irrigable from different rces of supply:

he extent to which such irrigation protects from ught the food crops of the district in which the- rks exist:

The possibility of extending irrigation still rther—
(*a.*) By the improvement of existing works;
(*b.*) By the creation of new works:

The obstacles to such extension arising from—
(*a.*) Any kind of administrative inefficiency;
(*b.*) The poverty and want of enterprise of the ryot.

These enquiries were embodied, as far as seemed able, in the Famine Commission's questions, which e mainly addressed to district officers. Now that the vers to those questions have for the most part been ived, it is time to request the local governments to s.n up the information before them, and to favour the Commission with their views regarding the different heads particularised in the preceding paragraph.

3. The district answers as to the first point, the area irrigated, should be compiled and, so far as they relate to canal irrigation, compared with the statistics of the Irrigation Department. From this compilation it will be easy to make out a statement shewing what parts of the country are least irrigated and are most in need of water. It will also be necessary to differentiate between the existing sources of irrigation, such as canals, wells, tanks, or ponds, and rivers, and to distinguish the permanent sources of supply from those which are liable to suffer from drought.

4. The next point is to shew what areas can be considered as requiring protection by means of irrigation, and what are actually so protected; and, in order to do this, it is necessary to decide what is meant by the term "protection." Careful consideration of this point is especially invited.

It has hitherto been held in the Irrigation Department that an area is "protected," of which a third part is or can be irrigated in a season of drought by a canal drawn from a permanent river, or by wells not liable to dry up. What light do recent facts throw on the correctness of this axiom? To what extent does such a proportion of irrigation save the "protected" area from the effects of famine?

This point being established, it will be possible to divide the cultivated area in each presidency or province into "protected" and "unprotected," and to state, approximately, the acreage of each class.

And it is further necessary to consider what regions are liable to suffer in an aggravated shape from drought, and how far the condition of the population is such that protection by means of irrigation is suitable or requisite. To this category perhaps belong the thinly populated regions near the Indian desert, where the inhabitants are accustomed to save themselves by emigration in time of drought.

5. As to the third head a resumé should be given of all irrigation schemes which have been prepared, or are under preparation, or have been or may now be suggested, in each Presidency or Province, whether they apply to the extension and enlargement of existing canals, or to new projects: the information given should shew—

(1.) If the scheme is unfinished, what stage it is in, what remains to be done, and what steps are being taken to complete it?

(2.) If the scheme is completely worked out, what is the estimated cost of construction and of management; what is the estimated return, direct and indirect (*i.e.*, from money-payments for the water used, from navigation, &c., or from enhanced land-revenue due to the increased value and capacity of the land); what is the area which the scheme proposes to irrigate, and to protect; what objections have been raised to the scheme, and what weight is attributed to them; whether the Local Government desires to carry out the scheme, and, if not, why not?

(3.) In either of the above cases, it should be stated whether the scheme applies to the protection of land already cultivated and inhabited, or to the improvement and reclamation of land now uncultivated and desert: and if the latter, how far it would beneficially influence the condition of the neighbouring cultivated and more densely peopled area.

(4.) Also whether the scheme is expected to be remunerative, if executed, and when executed, managed in the ordinary way; or whether, though not remunerative in a commercial sense, it would be expedient for Government to take it up at the risk of incurring a yearly charge with a view to protecting any area from famine:

(5.) Lastly, whether, in the case of works likely to be unremunerative, any general plan is recommended for adoption under which the necessary funds could be provided for their construction, or for meeting any yearly charge they would involve, without increasing the demand on the public revenues, which it must be assumed could not meet a growing change of this sort.

6. Referring to head (4.) of paragraph 1, the answers to questions IV. 21, 22, 23 will be before the Local Governments, and will have informed them as to the views held on those points by their local officers. The Famine Commission should be favoured with the opinion of the Local Government, recorded after a full consideration of these answers, as to the desirability and possibility of any reform in the system of canal administration, and of removing any obstacles which at present impede the spread of canal irrigation.

No. 169, dated 28th January 1879.

From Major R. H. PALMER, Executive Engineer, 2nd Division Bári Doáb Canal, to JOINT SECRETARY to GOVERNMENT PUNJAB, P. W. D., Irrigation Branch.

Referring to your No. 259 I of the 20th instant, I have the honour to forward the report on system of water distribution in the 2nd Division Bári Doáb Canal.

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BARI DOÁB CANAL, 2ND DIVISION, PUNJAB.

*Report on details of a system of water distribution where the proportion of water is issued in accordance with the area of land to be irrigated.*

Limit of irrigation.

It has been determined that only 20 per cent. of the gross area of a village should be irrigated, and that this proportion should apply to each separate holding.

Preliminary proceedings.

2. On commencing to issue water for such a village, a list* is prepared of the proprietors showing the extent of their holdings; each proprietor producing a list of the number of fields composing his estate, these title deeds being filed, and the village total area being checked, the distribution of water shares is proceeded with.

A fifth part of each estate has a fixed area of opening allotted to it in proportion to its area: it has been found that a pipe 0·4 feet in diameter will irrigate 20 acres of land by flow irrigation; thus each estate has a certain number or fraction of pipes allotted to it; and, on going through the whole list, it is found that a certain village, say of gross area of 4,500 acres, there are 900 acres to be irrigated, for which $9 \times 5 = 45$ pipes have been allotted.

3. It now remains for the proprietors to arrange amongst themselves the number and position of the outlets they will require to be made in the banks of the distributary, the aggregate of such openings being equivalent to 45 pipes of 0·4 feet diameter.

4. These matters take some days to arrange, the help and advice of an intelligent revenue official being frequently of much use; the position of neighbouring lands makes it convenient for proprietors to have one common channel to lead the water on to their lands, and soon all have so arranged as to reduce the total number of openings to 15, varying in size from 1 to 6 or 8 pipes each.

5. These are composed of the details given in the original list of the proprietors, where each estate has its number of pipes allotted to it, and each opening therefore is composed of a definite number of shares which can be identified on this original list.†

6. It not unfrequently happens that the arrangement made at first is not permanent and modifications have to be made in the size of openings.

If the outlet is a large one consisting of more than [illegible] outlet is built in form of [illegible]

14. By personally visiting each village and verbally explaining to the owners the terms on which the water would be granted, giving them an opportunity of there and then discussing with the canal officer all uncertain points, much delay and useless reference was avoided, and the system was most readily accepted, and is now much appreciated; from the assurance of the grant for water being on a more secure tenure, certain land making it impossible to be alienated, and farmed by speculators.

15. The various steps taken, as described in detail above, may be briefly repeated, thus— Co

1*st*.—List of owners of estate in whole village, including "common" and waste land, showing totals for each owner—
- *a*. Column showing area irrigable $\frac{1}{5}$ area.
- *b*. Column showing number of pipes to be issued for each estate.
- *c*. Column showing total number of pipes allowed for whole village.

2*nd*.—Abstract showing various groups of owners who wish to combine and have a common watercourse—
- *a*. Column of numbers showing estate referred to, see list No. 1.
- *b*. Names of principal owners.
- *c*. Number of pipes or parts of a pipe in out
- *d*. Total for each group or outlet.

Appended are samples of the papers alluded marked A., B., &c.

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No. 2718, dated Lahore, 17th April 1879.

From J. A. E. MILLER, Esq., Secretary to the Fi Commissioner of the Punjab, to the SECRET the FAMINE COMMISSION.

IN reply to your letter No. 758 of 7th curr desired to forward copy of correspondence no on the possibility of limiting the supply of w canal outlet to a stated proportion of a villag holding; and to state that Mr. Lyall's experie village communities in the country irrigat Bari Doab Canal, leads him to believe that, limited supply of canal-water to each village in the great majority of cases, in concert wit officer, backed by his authority, easily carry out a quite sufficiently equal distrib supply among individual holdings. Wh camp in [illegible]npian tahsil of the Lahor Fina[illegible]ner was told by the [illegible] and working very [illegible] Wace's last

l in its early state; but I think, on the whole, we ay conclude that fixing the size of the outlet in proportion to the area to be irrigated, though it is far from giving absolutely accurate results does approximately place the irrigating community on a fair basis with regard to one another, and this is all that we can hope to do, where the introduction of expensive machinery for regulating would be impossible from its cost, even if it could be made to work at all in water so laden with silt as that with which we have to deal is at most seasons of the year.

30. The next question is whether it is practicable to enforce the restrictions, not merely in each village as a whole, but separately in each proprietary holding.

Of this it does not appear to me that there can be any doubt. On the Bári Doáb Canal we have dealt principally with individuals, but the name of every man using the water of a water-course was registered from the commencement of the irrigation; if he did not get his water he complained, and the case was inquired into, and his rights enforced by the canal officer. On the Western Jumna Canal the officers have dealt generally with the village community, and the time for which each individual is allowed the use of the water is fixed by the people themselves; but if any individual is dissatisfied, he complains at once, and his rights are enforced after inquiry.

The essence of the new system now on its trial is, that efore irrigation commences in a village the share of ter to be given to each holding is declared, and a ement given to the owner. If he does not get his s, he will assuredly complain, and there can be no difficulty in enforcing them than there is at the nt time with regard to his share in the irrigation water-course.

system has been too short a time in use for any sion to be formed as to whether it will ultimately essful; it has only been tried on two distributa- n the older branches of the Bári Doáb Canal, eing applied to those of the new branches.

he method of procedure is, that when an appli- received from any village for irrigation, the each holding is made out from the village he canal officer announces the shares, the ipes which will be granted, and then leaves to settle how they wish the water-course ey cannot agree among themselves, or wish ork in a way which the officer does not points out the best manner of arranging they end in accepting his proposals, even may demur for a time. The owner of each ves a paper showing the proportion of the e is to be allowed to irrigate; but it is down that the right to water is given to a of the land, not to the in[illegible] Sales ition among families [illegible] but they should [illegible] ter than to th[illegible] ior Palm[illegible]

people taking the water, and after all the c[illegible] mercial speculation, and if it should be f[illegible] people defer taking the water because of th[illegible] ries to be gone through, I think it migh[illegible] necessary to relax the restriction as [illegible] holdings.

The limit as regards the village, I thin[illegible] strictly maintained in all cases, and the [illegible] holdings announced; but if after a reason[illegible] man failed to take up his share of the wat[illegible] others of the same village might be allowed [illegible]

34. Major Palmer's report alludes to n[illegible] but his distributaries were in the midst of [illegible] community, and the people had probably [illegible] anxious to get water.

Mr. Alexander, working on the new br[illegible] some of the people apathetic about taking up [illegible] and points out that unless all the landholde[illegible] a representative of each holding is present[illegible] position of the outlets or the location of the [illegible] can be proceeded with. If this is found t[illegible] in a district not many miles distant from [illegible] tract of country, I fear that on the opening [illegible] a district where such irrigation had not pre[illegible] practised, there would be delay in getti[illegible] taken up.

35. The most practical difficulty is the [illegible] construction of the water-course; for, if a[illegible] who are to be allowed to irrigate in a vi[illegible] come forward at first, the cost of makin[illegible] water-course will fall heavily on those who [illegible] proportion of the cost can be recovered [illegible] who subsequently comes forward, as th[illegible] provided for in the Canal Act; still it is [illegible] which presses heavily on the cultivator, an[illegible] deter him from irrigating unless allowed to [illegible] benefit of his expenditure.

To make the water-course at Governmen[illegible] recover from each irrigator the proportio[illegible] due to the share of water allotted to him m[illegible] canal lead to the locking up of much more [illegible] money temporarily than has yet been cont[illegible] this appears to me almost the only mean[illegible] the correct distribution of the water in [illegible] Further experience and consideration may [illegible] other method; and I am strongly of opin[illegible] system should at any rate be tried when [illegible] Canal is opened.

36. Even if there should be difficulty in [illegible] construction of the water-courses, the share [illegible] holding in every village capable of irrigat[illegible] prepared, even although it may be found [illegible] relax the rule fixing the distribution to a [illegible] each holding so far as to allow of the water [illegible] the same village; but I would on no acco[illegible] on the [illegible] llowed to th[illegible]

vators; this much complicated the question when the regular system was introduced.

Former method of distribution.

8. From the old Hasli Canal, as from the old Western Jumna Canal, water had been issued from openings in the bank of all sorts of sizes, some with masonry heads, but more often simply open cuts. The water-courses were made by the villagers themselves, and were tortuous in the extreme, and extremely numerous, as it was a very rare occurrence for the people of two villages to agree to take water from the same water-course.

Villages advised to make channels common to several villages.

9. The first step taken to improve this state of matters, on the older canals, was to induce neighbouring villages to combine their water-courses into one distributary, which was made by the canal officers, but paid for in shares by the different village communities, and remained their property.

First regular system of distributaries on the Ganges Canal.

10. The next step was on the opening of the Ganges Canal, when a regular system of distributaries was designed, but, as I understand, merely with the view of spreading the water to a greater distance from the canal than could be done by ordinary water-courses, and without any regard to the features of the country. The evils of this latter method had in some measure become apparent before the Bári Doáb Canal was opened; and it was decided from the first so to construct the distributaries of that canal as to occupy the water-sheds between the minor drainage lines; and if, as in some cases happened, it became necessary to cross a drainage line, to make the fullest allowance for passing it across the distributary.

Delay caused by [illegible] of [illegible]

11. This entailed a most extensive series of levels over the whole country, and occupied much time, during which the Government naturally pressed for an extension of irrigation and increase of revenue from the canals, so that each portion had to be opened as quickly as possible, and water given out without much attention to the question of the method of distributing it among the village communities.

Water given to any one who would take it.

12. Water was given to anyone willing to take it with only this restriction, that the irrigators from a water-course should belong to the same village; that no water should be issued from an open cut, but from a wooden tube of fixed dimensions placed in the canal at a place approved by the canal officer.

Those near old [illegible] than their shares.

13. *The villagers whose lands were in the neighbourhood of lands formerly irrigated from the old Hasli being better acquainted with the benefits to be derived, were naturally the first to apply for water, and thus obtained a great deal more than their due shares; and it very soon became apparent that unless some check was placed on this, there would be no water left for the villagers whose lands were situated on the lower portion of the canal where, owing to the dryness of the climate, the depth of the water in the wells below the surface of the ground and the nature of it where obtained (being too salt for drinking, and in some cases killing vegetation instead of promoting it irrigation was a greater necessity than in the upper tract, where the water was sweet and nearer to the surface.*

General Strachey directed that water should be fairly distributed over the canal tract.

14. About this time too much discussion had taken place about the distribution of water, and General R. Strachey, then Inspector-General of Irrigation, had pointed out that the supply of water should be so managed that along the whole length of the canal every village, and, if possible every holding, should receive what was necessary for as nearly the same proportion of its area.

Distribution by volume considered.

15. In considering how this was to be arrived at, the first point to be decided was whether it was possible to make the charge for a certain volume of water, instead of for a certain area irrigated. Many experiments were made with modules of different sorts, but the head of water between the distributaries and the country was so small and so irregular that no accurate means of measuring the volume could be found. Moreover, if it had been discovered, it is very doubtful whether the people would have understood it. Hence it was concluded that the only chance of approximating to a charge by volume was to decide on the dimensions of a pipe to be adopted as the unit for allotting the supply, to ascertain the probable amount of irrigation which could be [illegible] average conditions, and then to give each village [illegible] of these pipes in proportion to the area. Another advantage was expected [illegible] ding the quantity of water they were to [illegible] the people would be less lavish in their [illegible] obtain a greater amount of work from [illegible] than they had formerly

was also thought possible that when they had [illegible] perience of some years to guide them, the people perhaps, be induced to take a contract for the use opening, and thus approximate to a system of payi volume.

16. In deciding the size of the pipes to be used, t was little opportunity for making experiments, but a few were made by Mr. Palmer and his brother, M Palmer. Outlets of various forms and dimensions tried, and from these it was calculated that a pipe of of a foot in diameter kept running one day in four, a head on it of about $\frac{1}{10}$ths foot was sufficient for irrigation of about 20 acres in the rainy and 30 acres the cold season, and after much deliberation this was selected as the unit to be used in fixing the size outlets to be allotted to each village.

17. While these experiments were in progress, it been found that while the people on the upper port of the canal were tolerably regular in the use of water in the rainy season (kharif), they put off t water in the cold weather (rabbi) in hope of being to do without it, if seasonable rain fell. They w warned that if they once allowed the water to be allot to villages lower down the canal they could not hav in future years, and as they still declined to avail the selves of it, the opportunity was taken to make a adjustment of the supply.

18. There was also a point connected with the settlement of the land revenue which made it unfair the people to re-adjust their supply until a new one w made. This was that at the first settlement each villa the lands of which were irrigated, was, in addition to ordinary land revenue, charged with an additional for the benefits derived from irrigation; and this ha be paid during the currency of the settlem[illegible] w[illegible] the lands were watered or not. Hence t could not be made in their supply of wa new settlement came into operation, when was so adjusted that they had only to pa charged for irrigation when they used the otherwise.

19. The new settlement of land rev made, and the dimensions of the unit been fixed, we had now to re-adjust th of the water-course heads which had necessitated a most careful enquiry [illegible] as a most tedious The work [illegible] each water-cou the irrigators from had to be rec this had been entered at each hali for the assessment of water-rate, s ment was very trouble[illegible]me. The the small openings, especially on the the canal, where open cuts and very much than those allowed on the new distributar long in use. They also objected to the c supply being limited where they had been of using it irregularly in the hope of being without it; but, as they had frequently l that if once allotted to cultivators lower dow they could not possibly recover it, their com disregarded, and the small openings introdu

20. The result in economy of water was apparent. Water-courses on the lower po tributaries, which had almost fallen into d count of the irregularity of the supply, opened, and an increased duty was obtain water. I cannot say that it was distributed i to the area of the villages to any great extent of those who had for many years had the la had to be considered, especially of those wh from the old Hasli. Still a step was made i tion. It would take more time than could it now to show what the result has been in but the table given in the extract from M letter forwarded by the Commissioners sh the following districts the percentage of irrigated by the canal has been, on the av last three years, in—

| | |
|---|---|
| Gurdáspur - - - | 12·8 p |
| Amritsar - - - | 24·3 |
| Lahore - - - - | 21·3 |

which is not far from the 20 per cent. consider as the proportion to be desired.

In Gurdáspur little or no irrigation is c cold season (rabbi), which will in some [illegible] for the lower percentage in that district.

operation for over 50 years, and until a y recent date but little attention has been he minutiæ of irrigation. Establishments funds were limited, and the main business officers was to get a good supply into the range in a rough way for its distribution, the lower portions of the canal. Beyond ordering the closure of water-courses in the ns, it may be said there was little inter- the actual distribution. The village water- led out directly from the canal, and even to lay are, in many instances, unprovided with ds, so that there was little check on the water drawn off by them.

anted more water, the villagers widened the thus got as much as they wanted. When supply was forced into the canal to supply the lower portion, it frequently happens it reached its intended goal, being absorbed by increased supplies going down the un- ater-courses.

ystem has been gradually improved to a t; many of the cuts have been provided y heads; many of the old distributaries made villages have been obtained by Government prietors; but the restriction of the supply portion of the area has been impossible, on he portion of the assessment of the land e to irrigation having been fixed for the term lement, as explained above in para. 18.

channels were also aligned so as in many terfere with drainage, and without a thorough of the whole canal it was hopeless to intro- ore scientific system of distribution. This is now in progress; a new channel is being whole canal from about 20 miles above o Delhi. Carefully aligned distributaries gned to take the place of the old water- new settlement of the land revenue will ounced, in which the portion due to separated from the land revenue proper, will not have to pay it unless they use then it is proposed to introduce the enings and restricted irrigation, as far considering the claims of the cultiva- he use of the larger supply for so

o is making th[illegible]nt of the rnál (Mr. Ibbe[illegible] of opinion he fixed payment for the benefits l to many [illegible] the cultivators using t may be [illegible], but I am not very bject.

hus described the state of affairs formerly ulties in the way of a proportionate distri- e water, I will now proceed to the con- the questions asked in the 3rd para. of the rs' letter—

regard to the practicability of so regulating irrigation outlets as with fair accuracy to ient water for a previously fixed area.

t be supposed to say that anything like ccuracy will be possible; the whole system adaptation of means, such as they are, to e attained in the best manner practicable. nything like theoretical accuracy it would that at each point where a water-course ted, the following points should either be the variations known with such accuracy as alculation :—

of water on the outlet pipe.
of the ground outside the canal-banks.
ut of rain-fall in the tract.
ce of the lands to be irrigated from the canal,
nsions of the water-course.

arge of the pipe will vary with the two first ration and absorption with the two last, and of water required with the third.

if the engineering problem were solved there remains the more intricate one of the he irrigators; some castes are proverbially s, others are quite the reverse. In using vators will economise every drop, make mall and uniform, divide their fields into no more water than absolutely neces- rop has to be raised from a depth, and n their part and generally the use f them are comparatively careless is a vast difference between those of different castes, say the Ját and the Gújar, and a dry season will make the worst of them more economical. All we can hope then is to arrive at an approximation to accuracy in results; but although the areas irrigated in different tracts from the same openings may vary, still the same opening will be given for the same areas, so that the people will be everywhere treated in the same manner, and there will be no unfairness to anyone, although the results may not be exactly what we anticipate.

Some crops require more water than others, but those requiring more water are the most valuable, and the people adjust this themselves, so that, although the areas watered may be dissimilar on this account, the value to the people will not be affected by the limitation of supply.

27. I should have been glad to collect more statistics if time would have permitted it; but as it is, there has been great difficulty in obtaining the amount of information required by the Commission, and now the submission of the report has been imperatively demanded, I can do no more. Statistics.

I have obtained the following information for two of the distributaries where the pipe outlets have been some time in use :—

AMRITSAR RÁJBAHA.

| —— | Number of outlets. | Number of pipes. | Acres in rabbi. | Acres in kharif. | Total for year. |
|---|---|---|---|---|---|
| 1875-76 - | 158 | 347 | 18·6 | 12·5 | 31 |
| 1876-77 - | — | — | 19·9 | 12·7 | 32·6 |
| 1877-78 - | — | — | 29·9 | 10·4 | 40·3 |
| Average - | 158 | 347 | 23 | 12 | 35 |

RAEWIND RÁJBAHA.

| | | | | | |
|---|---|---|---|---|---|
| 1875-76 - | — | — | 14·1 | 9·4 | 23·5 |
| 1876-77 - | — | — | 18·4 | 5·76 | 24·16 |
| 1877-78 - | — | — | 20 | 8·6 | 28·6 |
| | 272 | 536 | 18· | 8 | 26· |

28. I have said above in para. 16 that from the experiments made it had been supposed that such a pipe as there described would afford irrigation to 50 acres during the year, viz., 20 acres in the kharif and 30 in the rabbi. When the outlets were first introduced, it was found that the cultivators did not obtain this duty from the water. An investigation of the actual work done on the Shálamár Rájbaha in 1872 showed that the average irrigation from a single pipe was only 5 acres in the kharif and 15 in the rabbi, or 20 acres in all. It was accordingly determined that one pipe should be allowed to every 20 acres of irrigation. The table above given appears to show that greater economy is now practised by the cultivators, and that as a matter of fact, the irrigating powers of one pipe might now be taken at 30 acres, viz., 10 in the kharif and 20 in the rabbi, and leads to the hope that eventually perhaps even the 50 acres may be obtained. Inferences drawn from above table.

But it will be seen from the difference between the number of outlets and that of the pipes in the table that many of them must consist of two and some of three pipes. Now we know by experiment that an outlet of two contiguous pipes will discharge about 2½ times as much as a single pipe.

The difference between the results on the two rájbahas will be in some measure due to the greater rainfall in the district where the first is situated, and perhaps in the kharif to the people in the latter not having yet got sufficiently accustomed to irrigation to commence growing the more valuable crops; while they can grow the fodder crops and inferior grains to some extent without irrigation.

The variations in the last year, 1877-78, shows the effect of an almost rainless season. The area in the rabbi is increased in both cases, but in the upper rájbaha that of the kharif decreased, because the unusual dryness [illegible]r rendered more frequent waterings necess[illegible] in the lower rájbaha the people were f[illegible]te largely the inferior grains and fodder [illegible]ally watered.

29. Further observations are evidently [illegible] to determine the area for which one [illegible] it must be remembered th[illegible]

*ppendix to the Note by the Chief Engineer, Irrigation Works, Pun*
*dated 4th November* 1878.

## Sirsa Canal Project.

1. The first tract to be considered is that between the Rivers Jumna and Gaggar.' Of this Sir Henry Davies wrote as follows in his Minute of 1876:

"There is still a vast area unprovided for where cultivation can with difficulty be carried on for want of means of irrigation.

"The water in the wells is more than 100 feet below the surface of the ground.

"The average annual rainfall is only 13·05 inches, and of this about 10 inches falls in the rainy season. If by any means water could be given, there can be no doubt that it would be a great blessing.

"* * * I consider that this project should on no account be lost sight of."

2. To water this tract the proposal is to enlarge the Western Jumna Canal from its head to Indri, so as to enable it to carry 5,000 cubic feet per second, instead of 2,800 cubic feet as at present, and to construct a canal for kharif irrigation only from Indri to Sirsa, capable of carrying 2,200 cubic feet per second.

3. It is estimated that this canal would cost 600,000*l*., and that the remodelling of the upper portion of the present main line would cost another 400,000*l*.; thus making a total of 1,000,000*l*, which includes charges of all kinds (both cash and book), as well as simple interest on the capital expended up to date of opening, on the assumption that sufficient money will be given to complete the work in five years.

4. The above estimates not only include all charges, but have been liberally framed, and, it is believed, will found excessive. It is considered, however, desirable id under-estimating in any shape.

This canal would be capable of irrigating at least ) acres during the kharif and perhaps 100,000 in abbi by giving waterings for ploughing and ting the land, before the river falls to its cold r level.

The returns have been estimated very low; and it s safe to calculate on the realisation (within a w years—say 10 to 15—after completion) of a ncome of 100,000*l*. The maintenance will certainly ed 30,000*l*. per annum, so that a profit of 70,000*l*., r cent., may be expected, and this without taking ccount any miscellaneous revenue which would rtainly accrue.

f 200,000*l*. were annually allotted, this canal would pleted in five years, and would then afford pro- to a large tract of country which is urgently in f it, and which suffered severely during the of 1877.

It would pass through parts of the Karnal, Hissar, irsa districts, and also through a portion of Patiala ry. The following figures give approximately the lation, total areas, present irrigation from all s, and probable additional irrigation in the British cts through which this canal would pass:—

| — | Population. | Acres. | | |
|---|---|---|---|---|
| | | Area. | Present irrigation. | Probable additional irrigation. |
| · · | 610,927 | 1,505,171 | 266,365 | 60,000 |
| · · | 484,681 | 2,265,128 | 70,171 | 120,000 |
| · · | 210,795 | 1,007,327 | 30,519 | 60,000 |

s this, it would be possible to irrigate about in Patiála territory; and, under these cir- that State would most likely contribute, as f the Sirhind Canal, a proportionate share cost, viz., 200,000*l*., leaving 800,000*l*. to v the British Government.

ation of this tract is recommended by the missioner in his answer to question 4 6; but I fear the consideration d until the effect

the main chan ascertained; bu of it will be rem

## Lowe

1. The next tract t square miles of high l land. A project for w canals from the Sutlej r elaborated by Colonel G the Government of Indi

2. The project, as then 3,600,000*l*., but has been i addition of the book charges for establishment which is n

3. The present estimate is c not likely to be exceeded if t 10 years from date of commenc

4. It is not only intended to lands, but also to secure the irri on the Inundation Canals of th and which, owing to its nature, is

5. This canal would afford irrig in the kharif and 450,000 acres i intended to carry 10,000 cubic feet the former and 5,000 cubic feet per latter season.

6. The gross income to be derived and occupiers' rates may be assumed on the Bari Doab and Western Jumna to 340,000*l*., whilst the yearly maintenan certainly not exceed 100,000*l*., leaving of 240,000*l*., or 4·8 per cent.

7. This profit could not, of course, b once, but might be reasonably expected 20 years after the opening of the canal.

8. If 400,000*l*. were allotted annually, th be completed in 10 years from date of c as more than one million sterling of the estimat given is due to interest and other book charges.

9. Of the country to be watered by this proje Henry Davies wrote as follows:—

"This tract comprises portions of the two distri Mooltan and Montgomery, containing four million acres of unappropriated waste land, the property Government, which could be cultivated if irrigation works were constructed, but without them must remain barren. The water in the wells is about 70 feet below the surface of the ground, and is generally brackish an unfit for drinking purposes or cultivation.

"The rainfall varies from 8·6 inches from Mont- gomery to 5 inches at Mooltan, to 3·3 inches at Mailsi. I consider that the want of additional canals in this tract is very great."

10. This project has been before the Government of India, but has been deferred, owing to the doubt whether population would increase rapidly enough to make it remunerative within any reasonable time, the principal portion of it lying in the districts of Mooltan and Montgomery, where the population only averages 80·17 and 64·45 per square mile of gross area.

The figures per square mile of cultivated area are 582 and 596, and of the irrigated area 736 and 956, so that it will be seen that an extension of the irrigated area is advisable, and this may be obtained by executing some small portions of the works. One such project is at present being prepared.

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## Sidhnai Canal (Inun

1. It is p to take th reach of t for the ir Ravi b

which shows
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also be able to
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ken as 20,000*l.*, and
would leave a net
cent. per annum. If
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,, cultivation,
,, irrigation; and this
ly prove beneficial.

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AB CANAL PROJECTS.

heme for watering this Doáb from
e Chenab River would cost nearly
sts of three projects, viz., a perma-
nundation canals.

canal from the River Chenab is in-
igation of the high lands. It would
ons, and would water 460,000 acres in
as much in the rabbi, or a total of
e supply in the former being taken at
er second, and in the latter 5,000 cubic

ncome from owners' and occupiers' rates
t 320,000*l.*, the annual maintenance at
ing a profit of 220,000*l.*, or over 8 per cent.
which may be expected to be realised in
years after the completion of the works.

000*l.* were allotted yearly, the work could be
d in 10 years from the date of commencement.

he Chiniot Inundation Canal is intended for the
of the low lands below Chiniot. It is esti-
e cost 350,000*l.*, and would carry 2,500 cubic feet
ond for kharif irrigation, and would water 150,000
s in the kharif, besides affording a first watering to
considerable area of rabbi crops.

The gross income might be taken at 25,000*l.*, from
which 10,000*l.* might be deducted for maintenance,
ving an annual profit of 15,000*l.*, or about 4·3 per
nt., without including any enhancement of land
evenue.

If 30,000*l.* were allotted yearly, this canal could be
completed in three years' and the income above noted
might probably be expected in from 5 to 10 years after
completion.

The Jhang-nagar Inundation Canal is intended for the
irrigation of the low lands above Chiniot. This canal is
estimated to cost 90,000*l.*, and with 1,500 cubic feet per
second would water 90,000 acres in the kharif, besides
affording a preliminary watering for the rabbi.

The gross income may be taken at 15,000*l.*, and the
maintenance at 10,000*l.*, leaving a net income of 5,000*l.*,
or a return on the capital of over 5 per cent. per annum,
which might be expected to be realised in from 5 to 10
years after the completion of the work.

If 90,000*l.* were allotted annually, this canal could
be brought into operation in two years.

jects, Sir Henry Davies wrote in his

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"In the Lahore District the population has increased from 107 to 214 per square mile since the first settlement; and although this may not be entirely due to the irrigation from the Bári Doáb Canal, still there can be no doubt that it has caused a large portion of the increase.

"In the case of the Rechna Doáb, the Siálkot District, bordering the hills, has a population of 510 to the square mile; Gujránwála, next below it, of 207; and Jhang, in which the greater portion of the irrigation would be, of 61.

There can be little reason to doubt that a similar change to that in Lahore would take place here if irrigation were introduced.

The land is of a better quality than that of the Bári Doáb, and the food-supply is insufficient for the present population.

"One of the inundation canals proposed, viz., that from Chiniot, would, no doubt, improve the cultivation of the low lands bordering the river, and would be valuable in itself; but I prefer the larger scheme, as it provides irrigation throughout the year; and I consider that where the ultimate complete success of the scheme is dependent on immigration, this is a most essential point."

12. Sir Henry Davies concludes by saying—

"Considering the large area of land of excellent quality now unculturable, on which land revenue and owners' rates will be obtained in addition to the direct water-rates, I have no hesitation in saying that this is likely to prove a most remunerative undertaking."

13. The following figures give the population, total area and present irrigation from all sources of the three districts in which it is proposed to irrigate, by means of these three projects, nearly one and a half millions of acres, viz., 900,000 from a perennial canal, and the remainder from two inundation canals. A very large proportion of this irrigation would be in the Jhang District, which, as will be seen, has an enormous area of which at present not one-sixteenth is irrigated.

| — | Population. | Acres. | |
|---|---|---|---|
| | | Area. | Present irrigation. |
| Siálkot - - - | 1,665,005 | 1,251,551 | |
| Gujránwála - - | 550,676 | 1,640,223 | |
| Jhang - - - | 348,027 | 3,649,551 | |

14. I now consider the Chiniot Inundation Canal the one which should be first undertaken; the other scheme would require too large an increase of the population to make it pay within any reasonable time; we must await an increase in the neighbouring thickly populated districts. The Chiniot Canal would water low lands in the Jhang District, where the population is—

61 per square mile of total area,
681 ,, ,, cultivation,
980 ,, ,, irrigation,

which show the advisability of some increase of the cultivated area which can only be obtained from irrig

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MINOR PROJECTS.

In addition to the large projects above mentioned several smaller ones have been proposed, such as—

1. The Montgomery Station Canal.
2. The Gamal or Lúni Project.
3. Abdal Rahím's Canal in Psa Khel.
4. The Chichálí Reservoir Scheme.

2. The line for the Montgomery Canal having been marked out, and the complete project will shortly be ready for submission. The other schemes have been more or less investigated, but no schemes have been worked out.

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4. As the system is confessedly in its infancy, I hope I shall not be misunderstood if I say that I think the form of the records of water distribution, judged by these tests, is capable of improvement.

5. In respect of the first test, I would point out that, in preparing these records, the canal officers must be understood as acting under section 31 of the Canal Act, 1873. Is the extract or sanad given to each holding to be interpreted as a written contract, or merely as an extract of the rules under which the water will be distributed? It would certainly be inconvenient to interpret it as a written contract. It is, in fact, merely an extract of the register of water distribution which the canal officer undertakes usually to maintain. But whatever this extract is intended to be, it should not be described as a sanad, but strictly and accurately in the terms of the section of the Canal Act by which its interpretation will be regulated.

6. The form of the sanad is certainly calculated to encourage the belief that the water is given to the individual, and not to his land. The check on which Major R. K. Palmer relies for this* will probably be found insufficient. And I recommend that every such document be faced with a copy of clause E. of section 32 of the Canal Act.

7. As regards the second and third tests mentioned above by me in paragraph 3, I am unwilling to make such details the subject of correspondence. But the importance of the matter is very great. The system which the canal engineers are developing will, in effect, make a new and very important addition to the records of our most valuable lands, and I strongly recommend that the form of these records, and the rules under which they are to be prepared and kept up to date, be made the subject of joint consideration by a Committee, composed of two canal officers who have been engaged in preparing them so far, and of an experienced settlement officer. The rules and forms arrived at by this Committee should, after sufficient consideration, be accepted by Government, and be gazetted under section 31 of the Canal Act, 1873.

8. The presence of an experienced settlement officer on the Committee will be very necessary; as the simplification and practical convenience of the record, and our ability to keep it up to date, will depend very much on its being conveniently connected with the settlement record, and with the patwaris' annual papers. If I can give any assistance in the matter, I will gladly do so.

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## NORTH-WESTERN PROVINCES.

No. 64 of 1879.

From the Secretary to Government, N.-W. Provinces and Oudh, to the Secretary, Famine Commission.

Dated Allahabad, the 8th January 1879.

I am directed to acknowledge your letter No. 326, dated the 4th November 1878, with which was forwarded a memorandum detailing the nature of the information required by the Famine Commission as to the extent of the protection afforded by existing canals and other means of irrigation, and as to the schemes which have been prepared or are under preparation for extension of irrigation.

2. The data at present before this Government are not sufficient to enable the Lieutenant-Governor to give a complete reply to the first question propounded, viz., what area is now irrigated or irrigible from different sources of supply. The Director of Agriculture and Commerce is engaged in the preparation of a memo. showing how much of the cultivated area is irrigated or irrigable from all existing sources, and this will be forwarded as soon as it is ready. In paras 1 to 6 of the memo. noted below† (copy of which is enclosed), full details are given of the area irrigated and irrigable from canals in operation.

3. In regard to the second question also, the extent to which such irrigation protects from drought the food crops of the district in which the works exist, I am to state that a precise answer cannot be given. His Honor concurs generally in the remarks made at pages 8 to 10 of Captain Pitcher's summary of answers to question I.—4 of the series of questions issued by the Famine Commission. Against severe and prolonged drought the only real protection is in canals, and even they are but a poor substitute for rain in the autumnal season, especially if, as happened in 1877, a hot scorching wind continues blowing when crops are on the ground that depend for nourishment as much on the moisture they imbibe from the air as on what is supplied at the roots. As Captain Pitcher says, the remarks of the Collector of Allahabad in his reply to question I.—4 put the case very clearly.

4. If there is abundant rain in the rainy season, jhils, tanks, and wells are replenished, and contain a supply of water by irrigating from which crops can be grown in the cold weather, even if no rain fall in that season. The outturn will be less, even in irrigated fields, than if there had been favourable rain; but there will not be a total loss of crop, as there must under the same circumstances be on unirrigated land. If, on the other hand, there be little or no rain in the autumnal monsoon, these sources either completely fail or yield a precarious and uncertain supply. There are no data for estimating what protection they would afford. The year 1877 would probably have furnished data for solving the question had not a fall of rain in October, and copious falls in the cold weather, made the cultivators in a great measure independent of irrigation. But generally it may be said that jhils and tanks at the end of September 1877 were quite dry, and wells had in many parts of the country, especially in Jhánsi, shown a tendency to become the same. The water-level was lowered in all; many dried up completely, and if the drawing of water for irrigation had gone on extensively during the cold weather, many others would soon have had their supply exhausted. If there had been a second year of drought, the consequences would have been more disastrous. There is, as Captain Pitcher and several officers point out, another cause besides shortness of water-supply that interferes with irrigation from wells in seasons of severe drought, and that is the want of pasture, which is the inevitable consequence of a complete failure in the autumn rains, and which, causing great mortality among the cattle, deprives the cultivator of the means of drawing water.

5. The extent to which wells and jhils will aid in protecting from famine depends, therefore, in a great measure on the character of the drought and upon its duration. They are invaluable in the event of early cessation of the rains (a not uncommon occurrence). If replenished in the rains, they are of great use in the early months of the cold weather, when no rain as a rule falls, and throughout the cold season, when the fall is generally scanty; but against a drought like that of 1877, they are of little use for the protection of ordinary crops. Jhils then fail entirely, and the best use for wells is, as remarked by Captain Pitcher, to raise with their aid such quick-growing and nourishing food as carrots. But though wells, jhils, and tanks will not protect from famine in severe drought, their usefulness in seasons of deficient rain is so great that their multiplication should be encouraged.

6. Absolute protection from drought is probably beyond the power of man to effect. The supply of our canals is not inexhaustible. All that can be said is that there have not yet been two successive years of drought as bad as 1877, and we can, therefore, assume with some confidence that the canals fed from the snows will always be able to provide for the irrigation of the area shown as irrigable from them.

7. In regard to the third question, the possibility of extending irrigation still further, it is necessary to consider separately (1) canals, (2) wells, and (3) jhils or tanks. For canals, full information is given in the note by the Chief Engineer and its appendices that accompanies this letter. Mr. Anderson shows what has been accomplished on the Ganges and Jumna canals, and what remains to be done before their full working power is reached. That the water carried by the Ganges Canal is not used so economically as it might be, and that with the same water-supply the irrigated area might be increased, will be evident on a perusal of the report submitted by a committee appointed to enquire into the increased evaporation of water in the canal-irrigated

* See paragraph 11 of his memorandum, dated 28th January 1879.

† Memo. by the Chief Engineer, North-Western Provinces, Public Works Department, Irrigation Branch, No. 1293 W., dated the 21st December 1878, and enclosures.

tracts of the Aligarh district, a copy of which is forwarded for the information of the Commission. It seems generally admitted, as the papers accompanying this report show, that flush irrigation is attended with much waste of valuable water. The means of preventing this and so rendering water available for more extended irrigation are under consideration, but no feasible plan has yet suggested itself.

8. In para. 8 of his note, Mr. Anderson enumerates the proposals for reform in canal administration which have been made from time to time. In regard to those numbered *a.* and *b.*, *viz.*, transfer of assessment and collection duties from irrigation to revenue officers, it will be observed that, after trial of various systems, that which has finally been adopted is to make canal officers responsible for assessment and revenue officers for collection. From the remarks made at page 13 of their reply to the Famine Commission's questions, Chapter IV., the board of revenue seem to think this as good a system as any that could be suggested, and so does Mr. Anderson. The lieutenant-governor would rather not commit himself to a decided opinion on this point at present. His honour is by no means satisfied that, if revenue officers had sufficient time at their disposal, it would not be better to entrust the assessment as well as the levy of the water-rates to them.

9. Referring to para. 9 of Mr. Anderson's memo., I am to remark that all officers consulted are agreed (*see* especially the board's remarks at pages 4 and 5 of their reply to the Famine Commission's questions, Chapter IV.) that, theoretically, the sale of water by volume is preferable to the system of charging for the area irrigated. The former plan would effectually prevent the lavish and wasteful application of water, and would indirectly do much to check the deterioration of the land from over-saturation; but all authorities admit that, as yet, a workable plan of arranging for charging for water in this way has not been discovered. Mr. Anderson shows that the system was tried and failed, and was finally abandoned with the approval of the best qualified officers.

As Mr. Webster (quoted by the board) says, a workable method must first be invented, and of this there seems little prospect. At the same time, he mentions facts which show that the people are themselves being educated to understand the evil done by the lavish use of water, and are gradually guarding against it. He thinks that we must trust to the increase of intelligence and the teaching of experience for the remedy of the abuse the present system leads to. If this conclusion is sound, it must also be admitted that, if the cultivator never took more water than he needs, the present system of charging by area would be as good as the other, while it would always be more easily worked.

10. In para. 10 of his note, Mr. Anderson remarks that the next best system to that of charging by volume is that of contract, based on the average of several years. He has discussed this system fully, and put up a number of valuable papers on the subject in his Appendix IV. He says that it has had a fair trial, and was abandoned* because of the great difficulties in working it, the chief being the impossibility of securing a fair distribution of water and of profits among the partners to the contract. The board (pages 5 and 6 of their reply to Chapter IV., question 14) come to the same conclusion, and hold that the difficulties in the way of a successful general adoption of the system are insurmountable. As a general system, therefore, it cannot, under present circumstances, be advocated; but there is no reason why, where circumstances are more favourable, it should not be followed. The irrigation officers are, however, quite ready to do so wherever there is any ground for expecting success.

11. Mr. Anderson's remarks (para. 11) in regard to the division of canal officers into two branches—engineer and revenue—with separate duties, seem sound and reasonable, and his honour concurs in them.

12. To sum up this branch of the general question, I am to remark that at present there are no changes in system of administration of a radical character that have been suggested which have not either been tried and found less efficient than the system now followed, which has gradually been elaborated as the result of many years' experience, or which do not seem open to very serious objections. Improvements in details are possible, and there are defects in the supply and use of water, the remedying of which requires serious consideration; but what form these remedies should take, and how they can best be applied, his honour is not prepared without further enquiry to say. The report of the committee (referred to in para. 7 above) will show some of the evils that the canals, as at present used, are causing. The measures that should be taken to check them are at present the subject of anxious consideration, as is the question whether it really is impossible to give the water by volume. They cannot be finally decided on without further patient and prolonged enquiry, but this has been ordered, and before long his honour hopes the matter will be ripe for the issue of definite orders. Improvement in the system of administration has from time to time been made as experience showed it was required and feasible. How far it is susceptible of modification or further improvement the enquiry into the whole question now about to be undertaken will show.

13. The next subject to be considered is that of the obstacles to the spread of canal irrigation. These are fully discussed by Mr. Anderson in para. 12 of his note. The question propounded by the Commission seems to refer rather to provinces where cultivators have shown more unwillingness to take water than has been manifested in these. The board in their reply to Chapter IV., question 23 (page 13), rightly observe that, wherever canal irrigation is offered in these provinces, it is accepted, slowly, perhaps, at first, and not greedily, until a year of drought opens the cultivator's eyes; but once he has found its value, he takes to the canal. No special measures to stimulate his willingness to use canal water are called for, while, as Mr. Anderson shows, everything that can be done to increase the available supply and to overcome reluctance to take water is being gradually done by the canal officers, and with time and continued effort they will be successful. The important problem now before Government is not how to induce people to take water, but how to guard against lavish waste, which diminishes the available supply and injures the land by exhausting it or developing *reh*, and to the solution of this problem serious attention is given.

14. For a description of projected and incomplete schemes of irrigation, I am to refer the Commission to Appendix II.† of Mr. Anderson's note. They are—

I. *The Betwa Canal.*—The views of the financial department in regard to this work will be found recorded in the resolution of this Government No. 831, dated the 30th October 1878 (copy enclosed).

II. *The Keyn Canal.*—This Government has recommended that this project be undertaken, if the Betwa Canal be found to be a success. *Vide* the resolution in the financial department, No. 1,630A., dated the 23rd December 1878 (copy enclosed).

III. *The Sardah Canal.*—This large project was abandoned in 1872, after the fullest discussion, and his honour is not prepared to recommend that it be revived.

IV. and V. *The Eastern Ganges and Rámganga Canals.* These have been abandoned, because the rivers from which the water was to be taken were found not to contain a sufficient supply.

VI. *The Bambúsa Canal.*—This was to be a branch of the Sardah Canal, but was abandoned, partly because of the insalubrity of the country traversed, and partly on the score of expense. It would not be remunerative, but it was not thoroughly investigated.

VII. *Tanks in Hamírpur.*—His Honour concurs in the remarks made by Mr. Anderson in regard to these works.

VIII. *Jhils in Rae Bareli.*—These, it has been ascertained, would not pay; but it would be worth while undertaking their formation as a relief work if famine required the provision of employment for the people.

IX.—The incomplete schemes are in Rohilkhand. They are of a petty character, and no definite opinion can be given as to them in their present stage.

15. All these schemes and those not yet complete, like the Lower Ganges Canal, refer to the irrigation of land already cultivated but needing to be protected from drought.

16. In regard to the extension of irrigation by means of the construction of wells and the obstacles to it, I am to refer the Commission to the papers forwarded with my letter No. 63½, of this day's date, from which it will be seen that an enquiry is to be instituted, with the view of determining the best mode of effecting this desirable object. His Honour is convinced that the formalities which are required to be observed by applicants for takávi advances, and the stringency of the rules as to the security to be given by the borrowers, and the repayment of the principal within the period of a few years, do prejudicially interfere with what it is

* pp. 22-26.

† p. 21.

most desirable should be encouraged, the voluntary construction of wells by landholders and tenants. The apathy of the people is the greatest obstacle, but this could in time be overcome if the way for obtaining advances were made smoother, and the rules as to repayment of principal and giving of security were made less stringent. His Honour has, in the letter referred to, made proposals to the Government of India, which, if approved and acted on, will show in what way the making of wells can be promoted, and how it will be best to proceed if, as may ultimately be found to be the case, it is necessary to empower the Government to compel landlords to provide the means of irrigating by ordering the construction of State wells. The knowledge of the agricultural conditions of the country is yet too imperfect to allow of such a measure being undertaken without careful preliminary enquiry. If the Agra and Ganges Canals were completed, if those from the Keyn and Betwa be made, and if the Rohilkhand Canals now in hand or projected are finished, then nearly all will have been done that can be to protect these provinces by canals, except in tracts that form the sub-Himalayan belt. Where canals do not extend, it is only by the multiplication of wells that a partial protection from drought can be given.

17. It remains to consider the subject of extending irrigation by making tanks and improving jhils. His Honour concurs in what Captain Pitcher says in his reply (page 2) to Chapter IV. of the Commission's questions. His Honour admits that there are many localities in which tanks will not succeed, but there are far more, well known to the people, in which they are sure to be of great use, and ought to be made. They will not prevent famine, because they run dry in great droughts, but they will be of great value in years of deficient rain. But the selection of sites in which to make tanks and improve jhils can only be undertaken by working through such an agency as his honour has proposed to employ for the promotion of well-making. The same officer could give his attention both to wells and tanks, and be guided as to the selection of the kind of irrigation to be provided by what he discovers as to the character of the soil and water supply. The Lieutenant-Governor has directed such an enquiry to be made in the Cawnpore district.

18. Copies of the replies to the questions of the Commission by the board of revenue, Captain Pitcher, and the collector of Allahabad, referred to in the foregoing paras., have already been furnished to you.

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No. 1285W.

Dated the 21st December, 1878.

*Memo. by C. C. Anderson, Esq., Officiating Chief Engineer, Irrigation Works, North-Western Provinces, on the Inquiries by the Famine Commission.*

1. In his Memo. No. 3434, dated 27th November 1878, the Secretary, General Department, in calling attention to the inquiries made by the Famine Commissioners in the memorandum accompanying their Secretary's No. 326, dated 4th November, 1878, asks for—

i. A statement showing for each district traversed by the canal.
   *a.* The area irrigated and irrigable.
   *b.* The protection afforded to food crops.
ii. A *resumé* of the irrigation schemes prepared, under preparation, and suggested, noting therein the several details given in paragraph 5 of the Famine Commissioner's memo.
iii. A Chief Engineer's note:
   *a.* On the proposals that have been made for reform in canal administration.
   *b.* On the removal of obstacles that impede the spread of canal irrigation.

2. The statement relating to canal irrigated areas, and the protection afforded thereby, will be found annexed (page 19). It will be merely necessary here to explain the statement and to note the general results the figures indicate.

The figures of columns 2 and 3 have been obtained from the census of 1872, and those of columns 6 and 11 from the irrigation returns of 1868-69 and 1877-78.

Column 5 gives the total yearly consumption of food in the districts treated. It is based on the population of the districts, and the average yearly consumption per unit thereof; this last is thus obtained—

*a.* Allowance fixed by Revenue Department Circular No. 51A., dated 11th May, 1878:—

| | | |
|---|---|---|
| Man | per diem - - | 12 chittaks. |
| Woman | ,, - - | 9¼ ,, |
| Child | ,, - - | 4 ,, |

*b.* Proportion of population in the Meerut division, page LXI., Census Report of 1872:—

| | | |
|---|---|---|
| Man | - - - | 17·4 |
| Woman | - - - | 15·2 |
| Child | - - - | 17·1 |
| | | 49·7 |

*c.* Then yearly consumption per unit of population will be—

$$\frac{(17{\cdot}4\times12)+(15{\cdot}2\times9{\cdot}5)+(17{\cdot}1\times4)}{49{\cdot}7}\times\frac{365}{40\times16}=4{\cdot}84 \text{ maunds,}$$

say 5 maunds.

Columns 8 and 13 give the estimated and possible production of food grain. The entries in column 8 are based on the irrigated areas of food grains, while the entries in column 13 are based on the total irrigated area, including the breadth under food, fibres, dyes, &c.

Columns 10 and 15 give the proportion of food consumption and food production on canal irrigated areas, in other words protection.

Thus in the doab districts, working with food irrigated areas, the protection afforded by the canals varies from one-tenth in the Etah and Farukhabad to three-fifths in Muzaffarnagar; and working with total irrigated areas, the protection is a minimum of one-ninth in Etah to a maximum of two-thirds in Muzaffarnagar.

3. Thus far irrigated areas have only been considered. It remains to show the results of irrigated and irrigable areas under existing conditions.

4. The estimated area irrigable from the Lower Ganges Canal is 735,000 acres, and that from the Agra Canal, in the North-Western Provinces is 225,000 acres. In Appendix I. is included 110,000 acres, already irrigated, on the Agra Canal, leaving then the total additional estimated irrigable area in the doab districts and the trans-Jumna parganas of Agra and Muttra at—

$$(735{,}000+225{,}000)-110{,}000=850{,}000 \text{ acres.}$$

The protection that under present conditions will be afforded, on the Lower Ganges and Agra Canals being brought into full operation, will then be:—

I. Food grains.

$$\frac{13{,}600{,}000+6{,}600{,}000}{55{,}270{,}000}=4\text{-}11\text{ths.}$$

II. Total areas.

$$\frac{16{,}685{,}000+850{,}000{,}000}{55{,}270{,}000}=5\text{-}11\text{ths.}$$

5. The protection noted in the preceding paragraphs is based on actual irrigated areas, and irrigable areas calculated on duties at present obtained, when it is considered that the maximum duty obtained from the water entering the head of the oldest canal of the province is but one-fourth to one-half the duty obtained from wells, it will be admitted that a far greater protection than is at present attained might well be looked for. That an increase in the duty of the water at command, and hence protection, is not only possible but highly probable, few can doubt. To obtain this increase will be the principal duty of the officers of the Irrigation Department during the next decade.

6. A *resumé* of the irrigation schemes prospected by the engineers of the Irrigation Department is annexed (pp. 21—22). The notes are complete and need no further notice.

7. The proposals for reform in canal administration that have been made from time to time, consist of—

*a.* Transfer of collection duties from irrigation to revenue officers.
*b.* Transfer of assessment duties from irrigation to revenue officers.
*c.* Sale of water by volume, instead of by area irrigated.
*d.* Assessment for a fixed period of water-rates, based on averages of a certain number of years, instead of half-yearly assessments based on the half-yearly irrigated areas.
*e.* Division of canal officer's duties into two branches—
   *a.* Engineers,
   *b.* Revenue,
and administration of each branch by separate officers.

8. So far back as 1864, a committee of canal and revenue officers was convened under the presidency of Mr. Williams, the commissioner of Meerut, to discuss canal management, and the transfer of collection and measurement duties to revenue officers.

His Honour the Lieutenant-Governor, North-Western Provinces, in reviewing the recommendations of the committee and of the Board of Revenue, directed, as an experimental measure, that the duties in connexion with the measurement of irrigation should for two years be transferred to the revenue officers of certain selected districts. This selection was determined not by the geographical position but by the abilities of the collectors of these districts.

After a full and complete trial, it was decided to revert to the old system, that is, to make canal officers responsible for assessments, revenue officers responsible for collections.

The accompanying paper (page 22) contains remarks on the subject.

9. It has been the aim of every officer of note, who has for any length of time been connected or attached to the Irrigation Department, to introduce a system of assessment based on the sale of water by volume. The more he learnt the more difficult became the introduction of the measure.

One of the most distinguished officers of the department, Colonel Baird Smith, was so determined to test practically the objections to the sale of water by volume, that, with the permission of the Supreme Government, he introduced the system on the Ganges Canal in its first year. He argued that with the people unaccustomed to canal irrigation, and with a body of officers on whose hearty support he could unhesitatingly count, the system would have a better chance of success than if attempted on a canal where these favourable conditions did not exist.

The system introduced in 1855 was in practice till the famine year 1861-62, when, on the urgent representation of Colonel Morton, Deputy Superintendent-General of Irrigation, its abolition, and the adoption of the irrigated area system, was agreed to by the Government of India. Colonel Morton's proposals met with the cordial approval of Colonel Baird Smith, at that time mint master, who admitted that the system had had a fair trial, and under existing conditions was unsuited to the country.

Colonel Dyas, who was Chief Engineer of the Punjab and North-West Irrigation Department for nigh upon twenty years, was so imbued with the advantages of the volume system that numerous experiments were carried out by himself and under his direction, with view to the invention of a module which would meet the conditions of the canals of Northern India. Up to the date of his death, in March 1868, a working module had not been constructed.

10. The next best system for the sale of water by volume is the assessment for fixed periods of water-rates, based on the average of a few years.

This system was introduced on the Western Jumna Canals so far back as 1830, and on the Eastern Jumna Canal in 1859. At one time 37 per cent. of the water-rate of the Eastern Jumna Canal was so assessed; gradually the contracts were given up, or rather renewal refused, until the income under contract fell to 1·4 per cent. of the total assessment.

That the system has had a fair and honest trial must be accepted. It was introduced on the Eastern Jumna Canal by Colonel Brownlow, when superintendent; it was fostered by Major Moncrieff, his successor; every endeavour was made to extend it by Major Harrison who followed; the writer of this note in reviewing the operations of 1868-69 remarked :—

"That the contract system is one in which the interests of the cultivator are identical with those of Government, in the economical distribution of the water, is fully borne out by this year's results."

It is needless to enter further on this subject. The accompanying collection, pp. 22-26, gives all that has been written on the subject.

11. There are many serious objections to the division of a canal officer's duties, and to the administration of each branch by separate individuals.

The present system is not only the most economical but is the best for the interests of the country.

In all sections of life it is an accepted fact that the man who devotes his time to one particular study is more proficient in it than he whose studies are multifarious; irrigation is no exception to this rule.

For the economical working of a canal it is necessary that the officers in charge should have received a fairly scientific education. In addition to a knowledge of engineering, the canal officer should possess a knowledge of soils, and of agricultural operations; all canal officers must possess the first, while the second is easy of attainment, and is in fact possessed by many of the officers of the Irrigation Department.

The administration of the two branches of a canal officer's duties was allotted to separate officers in the first large system of irrigation (Orissa) started in Bengal. Judging from results, that system of separate administration has not worked well. In the next large system of irrigation in that province, the Sone, the North-West system of administration has been adopted. Even in Orissa it has been found needful to entrust to the engineers some of the duties belonging, in the original scheme, to the revenue officers.

12. The obstacles to the spread of canal irrigation may be divided into—

1. Physical and natural.
2. Moral and artifical.

Under physical obstacles there are—

*a.*—Short supply of water.
*b.*—Absorption and evaporation.

While under moral there are—

*c.*—Conservatism of the people.
*d.*—Disregard by the people of all but their own immediate interests.
*e.*—Attempt to introduce a system not consonant with the ideas of the people.

The first can only be overcome by measures that if even practicable could not possibly be financially successful. Take, for instance, the great rivers of the Doab, the Ganges, and Jumna. An equal distribution throughout the year of the volumes carried by these rivers would admit of the present canal irrigated area being increased three to four fold, but the measures that this equal distribution of volume would require are beyond the power of man.

Though little, if anything, can be done to prevent evaporation, the loss by absorption is possible of reduction; measures are now in hand for determining the amount of the loss and the channels in which it occurs, these points having been determined, it will remain for the canal officers to devise means of reducing the loss to a minimum.

Before the construction of the Ganges Canal, irrigation in the northern districts traversed by it was unknown, and hence the spread of canal irrigation in these districts was slow in comparison with the progress made in the southern districts where well and tank irrigation had been in practice from time immemorial.

It was only dire necessity that drove the cultivator of the northern districts to take water; that necessity arose in the famine of 1860-61. It was when he found starvation staring him in the face, and that the only possible means of preserving life was in using the element that flowed past his door that he dug his water-course and irrigated his fields; once having experienced the benefits of irrigation he has never been backward in using it when need arises. He has even changed his agricultural operations, and now grows sugar, where wheat and barley only were grown.

One has but to see the wilful waste in village watercourses to acknowledge the utter disregard of the interest of others with which the people are imbued; many and many a cubic foot of water has been lost that might have been saved by the irrigator throwing a few spadefuls of earth in his watercourse; again, the canal officer has not unfrequently been accused of the grossest injustice because, forsooth, he has taken up a portion of one man's land for the construction of another man's water-course.

In the early years of the Ganges it was only possible for the canal officers to construct and maintain the main lines of distribution; again, by leaving the irrigators to construct their own village water-courses official interference was kept at low limit.

As the works approached completion the canal officers had more time to attend to the field distribution of his supply. He found the waste of water so great that by degrees one after another of the large water-courses were taken up and managed by Government. So important is the field distribution of water now considered, that in the latest project, the Lower Ganges Canal, the principal village water-courses were designed in conjunction with the main lines of distribution. Further, by a rule under Act VIII. of 1873, the length of a private water-course

cannot exceed one mile; water required for lands distant more than a mile from a distribution channel can only be given for a Government water-course.

It cannot be doubted for a moment that the system of sale of water by volume with which the Ganges Canal started, checked the spread of irrigation. To many educated people, the expression "a cubic foot of water "per second" conveys no meaning, what then must the ignorant "kaseri" have thought when he was told that water was to be had on payment of a certain sum for a "*pyaraa*," the technical vernacular term for a cubic foot per second. He knew well what a bigha was, he calculated his seed grain by the bigha, so also his produce, so also his rent, fixing his water-rate by the same standard made matters clear to him, and removed one of the obstacles to the early use of the water; under the volume or *pyaraa* system he had to pay a fixed sum whether his irrigated area was ten bighas or a hundred, while under the irrigated area system he paid only for the water he used.

SUMMARISING THEN.

*a.*—Measures are now in hand for overcoming some of the physical obstacles to the spread of irrigation.

*b.*—Measures have been introduced, and are in course of introduction for removing the moral obstacles, but as time is one of the principal qualities needed for this, rapid progress must not be expected.

Camp Shingate,
the 20th December 1878.

---

| District. | Cultivated area. | Population. | Yearly consumption per head. | Total yearly consumption. | Exclusive of Fibres, Dyes, Drugs. | | | | | Inclusive of Fibres, Dyes, Drugs. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Canal irrigated area. | Produce per irrigated acre. | Total produce on irrigated area. | Ratio of irrigated to cultivated area. | Ratio of produce to consumption. | Irrigated area. | Produce per irrigated acre. | Total produce on irrigated area. | Ratio of irrigated to cultivated area. | Ratio of produce to consumption. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | | | Maunds. | | | Maunds. | Maunds. | | | | Maunds. | Maunds. | | |
| Dehra - - | 42,248 | 110,945 | 5 | 285,000 | 14,282 | 10 | 140,000 | ·17 | 0·24=¼ | 15,057 | 10 | 150,000 | ·18 | ·26 ¼ |
| Saharanpur - | 805,120 | 884,017 | — | 4,420,000 | 148,021 | — | 1,480,000 | ·17 | 0·33=⅓ | 151,302 | — | 1,550,000 | ·19 | ·35=⅓ |
| Muzaffarnagar - | 700,540 | 690,107 | — | 3,450,000 | 202,673 | — | 2,030,000 | ·29 | ·58=⅔ | 212,653 | — | 2,130,000 | ·30 | ·62=⅔ |
| Meerut - - | 1,071,403 | 1,270,104 | — | 6,340,000 | 307,838 | — | 3,080,000 | ·29 | ·48=½ | 336,020 | — | 3,370,000 | ·33 | ·53=½ |
| Bulandshahr - | 875,320 | 930,607 | — | 4,650,000 | 151,211 | — | 1,510,000 | ·17 | ·32=⅓ | 198,078 | — | 1,980,000 | ·23 | ·42=½ |
| Aligarh - - | 919,880 | 1,073,333 | — | 5,360,000 | 103,014 | — | 1,030,000 | ·11 | ·17=⅙ | 153,343 | — | 1,570,000 | ·17 | ·28=¼ |
| Muttra - - | 827,843 | 887,089 | — | 4,440,000 | 42,994 | — | 430,000 | ·05 | ·09=1/11 | 69,274 | — | 690,000 | ·08 | ·16 1/6 |
| Agra - - | 873,976 | 1,000,367 | — | 5,000,000 | 70,007 | — | 700,000 | ·08 | ·13=⅛ | 74,436 | — | 748,000 | ·09 | ·14=⅛ |
| Farukhabad - | 644,733 | 918,850 | — | 4,590,000 | 53,529 | — | 400,000 | ·06 | ·09=1/11 | 54,742 | — | 547,000 | ·08 | ·12 1/12 |
| Mainpuri - - | 607,458 | 765,943 | — | 3,830,000 | 91,620 | — | 920,000 | ·15 | ·24=¼ | 114,911 | — | 1,150,000 | ·19 | ·30 3/10 |
| Etawah - - | 563,200 | 608,641 | — | 3,040,000 | 78,278 | — | 780,000 | ·14 | ·25=¼ | 114,175 | — | 1,140,000 | ·20 | ·34 1/3 |
| Etah - - - | 620,800 | 703,527 | | 3,520,000 | 28,952 | — | 280,000 | ·05 | ·09=1/11 | 38,251 | — | 380,000 | ·06 | ·11=1/9 |
| Jhansi - - | 482,560 | 317,826 | — | 1,590,000 | 101 | — | 1,000 | — | — | 189 | — | 2,000 | — | — |
| Cawnpore - - | 863,865 | 1,156,035 | — | 5,780,000 | 96,035 | — | 930,000 | ·11 | ·17=⅙ | 146,470 | — | 1,460,000 | ·17 | ·27=¼ |
| Hamirpur - | 800,128 | 529,137 | — | 2,650,000 | 1,136 | — | 10,000 | — | — | 1,150 | — | 12,000 | — | — |
| Bareilly - - | 1,228,020 | 1,507,139 | — | 7,540,000 | 55,049 | — | 560,000 | ·05 | ·07=1/14 | 59,141 | — | 590,000 | ·05 | ·08=1/12 |
| Gurgaon - - | — | — | — | — | — | — | — | — | — | 48,628 | — | 487,000 | — | — |
| Delhi - - - | — | — | — | — | — | — | — | — | — | 341 | — | 3,000 | — | — |
| Bijnor - - | 663,135 | 737,152 | — | 3,685,000 | — | — | — | — | — | 3,428 | — | 34,000 | ·005 | ·01=1/100 |

Irrigated areas are taken for—

Kharif - - - - - - 1877-78
Rabi - - - - - - 1868-69

The figures of Agra and Muttra, however, are based on the rabi irrigation of the Ganges Canal of 1868-69 and of the Agra Canal on returns of 1877-78.

STATEMENT OF IRRIGATION (IN ACRES) BY DISTRICTS IN THE NORTH-WESTERN PROVINCES.

| Districts. | 1869-70. | | | 1870-71. | | | 1871-72. | | | 1872-73. | | | 1873-74. | | | 1874-75. | | | 1875-76. | | | 1876-77. | | | 1877-78. | | | Average area of 10 years. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Kharif. | Rabi. | Year. | Kharif. | Rabi. | Year. | Kharif. | Rabi. | Year. | Kharif. | Rabi. | Year. | Kharif. | Rabi. | Year. | Kharif. | Rabi. | Year. | Kharif. | Rabi. | Year. | Kharif. | Rabi. | Year. | Kharif. | Rabi. | Year. | |
| Saharanpur - | 48,620 | 99,672 | 148,292 | 53,156 | 48,853 | 107,309 | 47,904 | 40,092 | 87,996 | 32,931 | 35,045 | 67,879 | 39,098 | 33,417 | 72,515 | 33,901 | 31,236 | 65,137 | 34,049 | 34,961 | 69,010 | 41,020 | 33,831 | 74,860 | 36,816 | 37,724 | 74,540 | 46,671 | 68,776 | 115,447 | 88,38 |
| Muzuffarnagar - | 63,726 | 240,483 | 304,159 | 74,126 | 72,397 | 146,523 | 59,097 | 77,686 | 136,783 | 45,804 | 73,572 | 119,376 | 50,532 | 61,042 | 111,594 | 49,221 | 66,834 | 116,055 | 45,405 | 69,351 | 114,756 | 61,886 | 68,728 | 136,608 | 57,177 | 77,093 | 134,270 | 76,195 | 81,694 | 157,889 | 147,201 |
| Meerut - - | 106,904 | 101,257 | 208,161 | 113,036 | 143,95 | 256,991 | 84,098 | 156,127 | 241,125 | 71,866 | 121,827 | 193,693 | 68,497 | 109,984 | 178,481 | 78,084 | 105,231 | 183,315 | 68,276 | 119,302 | 187,578 | 85,129 | 126,642 | 211,771 | 97,015 | 144,101 | 241,116 | 152,215 | 102,728 | 254,943 | 215,71 |
| Bulandshahr - | 45,583 | 110,037 | 155,620 | 64,388 | 69,021 | 133,413 | 42,242 | 79,729 | 121,968 | 35,611 | 59,202 | 94,815 | 39,758 | 66,345 | 106,103 | 50,665 | 66,233 | 116,898 | 66,360 | 71,356 | 137,716 | 45,388 | 70,919 | 116,307 | 47,447 | 77,318 | 124,765 | 85,712 | 66,936 | 152,648 | 126,027 |
| Aligarh - - | 46,351 | 82,574 | 128,925 | 55,990 | 59,947 | 115,937 | 44,871 | 68,010 | 112,881 | 46,202 | 47,767 | 93,069 | 40,070 | 51,063 | 91,133 | 41,597 | 63,495 | 105,092 | 39,751 | 74,978 | 114,729 | 38,949 | 70,419 | 109,368 | 38,414 | 64,862 | 103,276 | 70,486 | 71,527 | 142,013 | 111,732 |
| Muttra - - - | 8,772 | 14,539 | 23,311 | 7,689 | 10,942 | 18,631 | 7,339 | 12,124 | 19,763 | 6,497 | 10,478 | 16,975 | 6,412 | 13,243 | 19,655 | 6,136 | 393 | 6,529 | 8 | 3,766 | 3,774 | 2,137 | 8,167 | 10,304 | 5,136 | 9,345 | 14,751 | 18,906 | 35,953 | 54,859 | 18,858 |
| Agra - - | 812 | 1,029 | 1,841 | 587 | 845 | 1,432 | 525 | 959 | 1,484 | 599 | 962 | 1,561 | 589 | 2,169 | 2,758 | 513 | 13,121 | 13 634 | 7,279 | 22,703 | 29 982 | 10,049 | 23,182 | 33,231 | 15,822 | 30,094 | 45,916 | 35,575 | 53,279 | 88,852 | 22,066 |
| Etah - - - | 12,985 | 22,768 | 35,753 | 12,041 | 17,755 | 29,796 | 10,151 | 18,208 | 28,457 | 11,716 | 14,963 | 26,579 | 8,433 | 15,775 | 24,208 | 9,537 | 19,589 | 29,126 | 8,277 | 20,582 | 28,859 | 8,382 | 17,869 | 26,251 | 6,776 | 13,775 | 20,551 | 14,735 | 15,910 | 30,643 | 28,022 |
| Mainpuri - - | 31,961 | 66,544 | 98,515 | 17,81 | 39,123 | 56,933 | 13,000 | 45,101 | 60,101 | 13,598 | 33,501 | 47,097 | 16,542 | 49,171 | 65,715 | 20,112 | 57,987 | 78,099 | 22,613 | 74,487 | 97,100 | 24,783 | 70,784 | 95,567 | 22,092 | 61,193 | 83,285 | 47,601 | 44,318 | 91,919 | 77,487 |
| Farakhabad - | 14,296 | 29,905 | 44,202 | 11,102 | 12,81 | 23,914 | 8,303 | 18,655 | 26,958 | 6,633 | 13,112 | 19,745 | 9,159 | 21,811 | 30,970 | 9,185 | 25,589 | 35,074 | 11,988 | 30,388 | 42,376 | 13,876 | 27,115 | 40,991 | 12,514 | 27,239 | 39,753 | 24,632 | 17,943 | 42,575 | 34,656 |
| Etawah - - | 33,083 | 55,108 | 88,191 | 17,218 | 38,492 | 55,710 | 17,200 | 49,666 | 66,866 | 15,106 | 35,505 | 50,671 | 20,390 | 59,316 | 79,706 | 25,875 | 74,185 | 100,060 | 27,246 | 85,418 | 112,664 | 31,782 | 78,417 | 102,199 | 32,245 | 73,645 | 105,890 | 58,762 | 43,147 | 101,909 | 86,387 |
| Cawnpore - - | 32,911 | 73,801 | 106,212 | 28,586 | 56,315 | 84,881 | 27,158 | 47,784 | 74,942 | 18,625 | 48,315 | 66,940 | 27,389 | 59,091 | 86,480 | 33,147 | 81,149 | 114,296 | 39,276 | 102,300 | 141,576 | 44,531 | 98,466 | 142,997 | 41,389 | 102,904 | 144,293 | 74,171 | 78,522 | 152,693 | 111,530 |
| Delhi, Agra Canal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 37 | 37 | 20 | 46 | 66 | 4 | 22 | 26 | 150 | 190 | 340 | †116 |
| Gurgaon, Agra Canal | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 9,410 | 9,410 | 2,167 | 7,388 | 9,555 | 4,847 | 10,264 | 15,111 | 16,790 | 31,838 | 48,628 | *20,626 |
| Dun - - | 4,144 | 9,810 | 13,954 | 4,247 | 6,18 | 10,429 | 4,655 | 7,763 | 12,418 | 5,535 | 5,504 | 11,039 | 5,217 | 8,785 | 14,00: | 6,192 | 6,862 | 13,044 | 5,595 | 10,020 | 15,615 | 6,243 | 6,156 | 12,399 | 5,726 | 6,869 | 12,595 | 4,979 | 7,381 | 12,360 | 12,785 |
| Bijnor - - - | 146 | 1,509 | 1,655 | 1,060 | 31( | 1,376 | 554 | 1,880 | 2,434 | 1,113 | 522 | 1,635 | 1,246 | 2,159 | 3,405 | 2,680 | 769 | 3,449 | 918 | 1,392 | 2,310 | 1,169 | 1,876 | 3,045 | 2,721 | 1,711 | 4,432 | . 648 | 1,475 | 2,123 | 2,586 |
| Tarai - - | 3,622 | 4,573 | 8,195 | 2,996 | 1,398 | 4,394 | 2,700 | 1,608 | 4,308 | 1,370 | 708 | 2,078 | 3,449 | 3,065 | 6,514 | 4,362 | 3,123 | 7,485 | 3,449 | 2,472 | 5,921 | 3,552 | 4,901 | 8,453 | 3,655 | 2,637 | 6,292 | 1,795 | 292 | 2,087 | 5,57 |
| Bareli - - | 29,319 | 29,39[illegible] | 58,717 | 31,649 | 9,403 | 41,010 | 25,037 | 26,888 | 51,925 | 19,703 | 17,539 | 37,252 | 16 507 | 29.222 | 45,729 | 29,041 | 30,339 | 60,000 | 7,995 | 17,810 | 25,805 | 8,474 | 41,838 | 50,312 | 33,181 | 34,846 | 62,807 | 21,277 | 6,712 | 27,989 | 46,69: |
| Jhansi - - - | — | — | — | 3 | 88 | 122 | 12 | 141 | 153 | [illegible] | 17: | 180 | 21 | 420 | 441 | 30 | 560 | 599 | 50 | 717 | 767 | 45 | 408 | 453 | 2[illegible] | 254 | 282 | 20 | 445 | 474 | †386 |
| Hamirpur - | — | — | — | 64 | 197 | 840 | 40 | 387 | 794 | 207 | 707 | 1,004 | 298 | 880 | 1,176 | 309 | 1,021 | 1,420 | 271 | 1,122 | 1,393 | 199 | 1,251 | 1,150 | 225 | 457 | 682 | 260 | 757 | 1,017 | †1,085 |
| Total - | [illegible]1,23 | 842,167 | 1,12[illegible],40 | 01,[illegible]2 | 388,018 | 989,673 | 338,152 | 653,203 | 1,051,355 | 333,117 | 519,372 | 852,489 | 753,619 | 586,958 | 940,577 | 401,576 | 617,736 | 1,049,312 | 389,706 | 752,572 | 1,142,278 | 429,784 | 758,403 | 1,188,187 | 463,590 | 776,353 | 1,239,883 | 731,585 | 729,843 | 1,461,428 | 1,155,873 |

* For 4 years only.

† For 9 years.

*Resumé of Irrigation Schemes prospected by the Irrigation Department since* 1867-68.

### I. Betwa Canal.

The Betwa Canal is to be fed by the waters of the Betwa river, one of the principal streams of Bundelkhand. It is to irrigate that portion of the Jalaun district of the Jhánsi division that lies between the Betwa and Pohoj rivers. It takes out of the Betwa at Paricha, a village on the left bank of the river, and distant nine miles from Jhánsi; after running in one channel for a length of 19 miles it bifurcates, one branch keeping on the left bank of the Betwa, the other on the right bank of the Pohoj.

The first detailed estimate of the canal was prepared in 1867-68. The data relating to the volume carried by the river being imperfectly known led to the scheme being postponed from time to time. The gauging of the river for the last 10 years, two of them years of drought, having determined fairly the volume of the river, the final estimate was submitted to the Government of India in 1878:—

*a.* Estimated cost - - Rs. 27,50,000
*b.* Maintenance charges - - ,, 1,00,000
*c.* Estimated gross income—
1. Direct - - - ,, 2,37,800
2. Indirect - - ,, 79,300
*d.* Estimated irrigated area - ,, 93,400
*e.* Protection Nine-twentieths (9-20ths) of the Jalaun district.

The scheme has been submitted to the Government of India for sanction; it meets with the approval of the local Government; it applies to the protection of inhabited and cultivated areas; it is expected to be just remunerative; it will be managed by the officers of the Irrigation Department; as it is expected to be just remunerative, and as the interest charges will for some years exceed the net income, the local Government has asked the Government of India, in consideration of the protection the scheme will afford to the imperial land revenue, to take it up as an imperial work.

### II. Keyn Canal.

The Keyn Canal is to be fed by the waters of the Keyn river, the second stream of Bundelkhand. In its main features it is similar to the Betwa Canal. It takes off from the right bank of the river at Keroni, a village belonging to the Chirkari State, and situated 40 miles from Bánda. It will irrigate that portion of the Bánda district of the Allahabad division which lies between the Keyn and the Bhagni rivers, after a course of 16 miles in one channel it bifurcates, one branch keeping close to the right bank of the Bhagni and the other to the left bank of the Keyn.

The first estimate of the scheme was prepared in 1871-72, but, as with the Betwa, the supply available being unknown, the scheme was postponed till 1878, when it was submitted to the Government of India.

*a.* Estimate - - Rs. 46,00,000
*b.* Maintenance charges - - ,, 75,000
*c.* Estimated gross income—
1. Direct - - 2,55,000
2. Indirect - 83,000 ,, 3,38,000
*d.* Estimated irrigated area - 88,000 acres.
*e.* Protection (4) One-fourth of Bánda district.

The scheme has been submitted to the Public Works Department of the Government of India, and the opinion of the local Financial Department will soon follow; it meets with the approval of the local Government; it applies to the protection of inhabited and cultivated areas; it will be managed by the officers of the Irrigation Department; it is expected to be remunerative. The local Government considers that if the Betwa Canal is found to be a success, that canal being in all respects similar to the Keyn, it would be a wise and politic measure in the interest of the imperial revenue, and, in view of the general welfare of the country, to construct the Keyn Canal on the analogy of the Betwa works.

### III. Sardah Canal.

The Sardah Canal is to be fed by the waters of the Sadah river, a snow stream, which for the greater length of its upper course forms the boundary between British India and Nepal. It takes out from the right bank of the river at the hamlet of Bambassa, a few miles below the hill town of Barmdeo, It was to irrigate the Sháhjahánpur district of the North-Western Provinces, and the entire province of Oudh.

The scheme was prepared in 1870, but was postponed by the orders of the Government of India.

*a.* Estimate - - - Rs. 6,17,15,[illegible]
*b.* Maintenance charge - - ,, 10,[illegible]
*c.* Estimated gross income—
1. Direct - - - ,, *63,94,[illegible]
2. Indirect - - ,, 19,87,[illegible]
*d.* Estimated irrigated area - ,, 23,84,[illegible]
*e.* Protection (3-11ths) Three-elevenths of the province of Oudh, and the Shájahánpur, Azamgarh, Jaunpur, and Benares districts of the North-Western Provinces.

This scheme was submitted to the Government of India in 1870; it did not meet with the approval of the local Government nor with that of the Government of India; it was objected to mainly on the grounds of its not being required by the people, or not being necessary to the prosperity of the country; it applies to the protection of inhabited and cultivated areas; it is expected to be remunerative. For further information regarding this canal the proceedings of the Government of India should be referred to.

### IV. Eastern Ganges Canal.

This was a scheme for irrigating the western portions of the Rohilkhand division; it was to take off of the left bank of the Ganges at the village of [illegible]. Preliminary estimates were prepared in 1869-70. The scheme was abandoned in 1874, as it was found that the supply of the Ganges was barely sufficient for the demands of the Upper and Lower Ganges Canals.

*a* Estimate - - - Rs. 81,88,[illegible]
*b.* Gross income—
Direct - - ,, 12,[illegible]
*c.* Irrigated area - - ,, 67[illegible] acres.

Maintenance charges were not allowed for in this estimate, nor was any credit taken for indirect income. As the scheme has been abandoned there is nothing to be gained in giving improbable and impossible figures.

### V. Ramganga Canal.

There were two projects for this canal, [illegible] one on the right the other on the left bank of the Ramganga river, both taking out at Kalagarh. Both schemes were for the irrigation of the Moradabad district. The left bank scheme was early abandoned on account of its heavy cost, it crossing heavy and numerous hill torrents. The right bank scheme after full investigation was abandoned on account of the supply of the Ramganga having been found to fall so low as 50 cubic feet per second in the dry months of May and June.

### VI. Bambassa Canal.

The Bambassa Canal was to be fed from the Sardah river. It was intended partly to supplement the supply of the main lines in that portion of Rohilkhand that lies between the Deoha and the Dhora, and partly to admit of the construction of new lines such as the Dhora, the Bareilly, the Faridpur, the Pilibhit Canals; the Deoha on the east and the Dhora on the west were the limits of the country to be affected:—

*a.*—Estimate - - - Rs. 45,[illegible]
*b.*—Maintenance charges - ,, 1,[illegible]
*c.*—Gross income—
1.—Direct - Rs. 3,81,600
2.—Indirect - ,, 1,33,400 ,, 5,[illegible]
*d.*—Estimated irrigated area - [illegible]
*e.*—Protection. (2-7ths) Two-sevenths of the Bareilly district.

The canal in its upper course traversed a tract of country crossed by numerous heavy hill streams and torrents, and unfit for many months of the year for the habitation of man. It was partly on the score of unsalubrity of country, and partly on score of expense, that the scheme did not meet with the approval of the local Government.

The Bambassa canal was to protect inhabited and cultivated areas, though the main line for the greater part of its length traversed uninhabited tracts, it was not expected to be a remunerative work. It is difficult to say whether the scheme would be one which the Government might undertake even if unremunerative

* Occupier's rates - - - Rs. [illegible]
Miscellaneous - - - [illegible]

for it was not investigated on this basis, and to give a reliable opinion on this point would need an investigation that could not be concluded within a twelvemonth.

### VII.—Tanks in Hamirpur.

These tanks were nine in number, scattered over the western portion of the Hamirpur district of the Allahabad division. They were to be filled by the usual rainfall, and were to supply water for the irrigation of the adjoining villages.

| | |
|---|---|
| *a.*—Estimate | Rs. 25,043 |
| *b.*—Maintenance | ,, 697 |
| *c.*—Gross income— | |
| 1.—Direct | ,, 1,742 |
| *d.*—Area irrigated | ,, 875 acres. |

These schemes did not meet with the approval of the local Government, they apply to inhabited and cultivated areas, their reproductive nature was doubtful; if the Keyn Canal is constructed it would be expedient for Government to make these lakes, as the professional supervision thereby possible would lead to full duty being obtained; such small works should not be constructed from borrowed money but from surplus income.

### VIII.—Jhils in Rae Bareli.

With view to providing work for the famine stricken population, a scheme for improving and deepening two large systems of jhils in Rae Bareli was investigated in 1877 by the Irrigation Department.

| | |
|---|---|
| *a.*—Estimate | Rs. 1,79,854 |
| *b.*—Maintenance | ,, 637 |
| *c.*—Gross income— | |
| 1.—Direct | ,, 6,370 |
| 2.—Indirect | ,, 2,123 |
| *d.*—Area irrigated | ,, 5,510 acres. |

The local Government is desirous of carrying out these schemes, but from funds at its disposal; they are for the protection of inhabited and cultivated areas not directly remunerative; they would be under the management of the local revenue officers; it would be expedient for Government to undertake the work, but only in seasons of drought.

### IX.—Incomplete Schemes.

The irrigation schemes now under investigation are all in Rohilkhand; they are in different stages of advancement; one has been estimated by the Executive Engineer, and is undergoing examination at the hands of the Superintending Engineer; two others have been surveyed, and are now being estimated by the Executive Engineer; the surveys for a third have just been commenced.

### X.—Sanctioned Schemes now in Execution.

These have been noted in para. 4 of Officiating Chief Engineer's memo. accompanying and need not be noticed further.

Clinton C. Anderson,
*Offg. Chief Engineer, I. W., P. W. D., N.-W. P.*

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From Secretary to the Government of India, Public Works Department, to Under-Secretary to Government, North-Western Provinces, Public Works (Irrigation Branch) Department (No. 504C.)—Dated 6th June, 1866.

Sir,—The Resolution of the Lieutenant-Governor, North-Western Provinces, No. 3567A., dated the 11th August, 1864, on the subject of the system of collecting the water-rates of the canals, has been under the consideration of the Government of India in this department, in connection with other matters of canal administration.

2. In that Resolution His Honour the Lieutenant-Governor established experimentally for two years the system of assessment and collection of rates recommended by Mr. Hume, Collector of Etáwah. The period fixed for the experiment has now nearly expired, and the Governor-General in Council will await a report of the result. I am, however, to state that His Excellency in Council quite concurs with the Honourable the Lieutenant-Governor on all the main points embraced in the Resolution.

3. In reference to para. 5 of the Resolution, and to the 3rd and 7th paras. of Colonel Morton's note, which accompanied it, I am directed to state that the Governor-General in Council is disposed to insist fully on the complete responsibility of the canal officers for the administration of the irrigation up to the point of the actual collection of the water-rates; and in this view His Excellency in Council would have preferred that the appeal, in cases of objection to the assessment of water-rates, should lie only to the canal officers.

4. The Governor-General in Council trusts that the orders contained in the 7th para. have fulfilled their intention in the important matter of punctual settlement and realization of the water-rates. The delays which formerly prevailed, owing to which sometimes the rate for one crop was not settled until the next crop was in course of growth, showed that this matter greatly needed reform.

5. But the main point is to secure the early completion of the village maps and records. When this has been secured, all measurements may cease, and the assessment be fixed by simple inspection of the fields irrigated, their area being already known and recorded. The Governor-General in Council would not, however, raise any question as to the payment by the Canal Department for the completion of these records. These are an essential part of the village revenue records, and the duty of completing them falls properly on the Land Revenue Department. The wants of the Irrigation Department are an additional reason for hastening their preparation, and for beginning first with those villages which are irrigated by the canals; but it does not appear to the Governor-General in Council that this renders it desirable to complicate the accounts by entering into an arrangement to share the payment between two departments of the Government, which benefits together with its subjects, by the progress of this work. But even were the propriety of joint payment more clear, it is contrary to the spirit of recent financial measures to insist on minute accuracy in adjustments of this sort between Government departments. These adjustments really have no practical importance, and do not appreciably affect the final result in charges on so large a scale as those of the Revenue and Public Works Departments.

6. This point, however, is of minor importance. The essential thing is to hasten the completion of the village maps and registers, and the Governor-General in Council hopes to learn that good progress has been made in this work.

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Extracts from the Records of the North-Western Provinces, Irrigation Branch, relating to Contract Irrigation on the Eastern Jumna Canal.

*Extracts paras.* 34-39 *from Revenue Report, by Superintendent General of Irrigation, for* 1860-61.

Para. 34.—In September, 1859, also, Major Brownlow proposed a trial, which was acceded to by the Government, of a contract system of irrigation being made in the first or Saháranpur zila, for periods, of three years, with the object of inducing the zamindars to extend the irrigation, in the expectation that, when they had experience of the advantage of so doing, they would at the close of their contracts be willing to renew their engagements, and to pay a fair price for a continuance of that advantage.

Para. 35.—Major Brownlow, however, was only able to conclude these contracts with 12 villages in the first zila, which were binding for a period of three years from 1st May, 1860; and he reports, "that they have as yet "proved most beneficial to the villages that have "entered into them," and the following to be the causes which materially delayed action in the matter,—

"1st.—The necessity for substituting masonry for

wooden irrigation outlets, before introducing the contract system as directed by you."*

"2nd.—The extreme suspicion with which the new arrangements were regarded by the zamindars."

"3rd.—My own fears during the past famine year, of not being able to comply with the terms of the contract on my part, and thus giving the system a bad name at the outset."

Para. 36.—"As regards the first of the above causes of delay, I must explain that in the end of 1859, a great majority of the irrigation outlets in the Saháranpur zila were of wood, and that it is no easy matter on our long established lines of irrigation to effect a rapid substitution of masonry for wooded outlets, which can only be satisfactorily accomplished with closed rájbahas."

Para. 37.—"As regards the second cause, I thought it best to let time work its own cure of the absurd and unreasonable prejudices that existed against any change in system, without appearing too anxious myself to bring it about."

Para. 38.—"With reference to the third, my great difficulty was a clause in the contract, much insisted on by all inquirers to the effect, that the contractor was entitled to 4 days' water in the week."

Para. 39.—"Now, with our diminished supply last year, I could not have complied with this condition in Saháranpur, without ruining every cultivator in the Meerut and Muzaffarnagar districts,—an injustice I had no mind to commit. We only saved the rabi crop by the most irregular measures, denying water to men who had sown on low grounds, and could do without it for a time, in order to give to those who were less fortunately situated, and in greater need. I had to offer all contractors the option of returning to the measurement system if they chose; and though none did so, I could not at the commencement of the year be aware of this, nor did I consider the time a favourable one for introducing a change."

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*Extract para.* 12 *from Revenue Report, by Superintendent-General of Irrigation for* 1862-63.

Para. 12.—The introduction of the contract system, which commenced this year proceeds, though slowly, under the management of the native Deputy Superintendent Suraj-ud-din; in spite of the unwearied efforts of that officer, whose exertions to introduce the system were so highly praised in last year's report (praise which he continues to deserve), the irrigating community generally refuse to embrace willingly the advantages offered them. Many villages declined altogether to take their water by contract, but about 62 have done so. In the 200 villages where the system has been in operation for a year, it appears to work satisfactorily. The zamindars almost invariably acknowledge the benefit they have derived from the change, and infrequent disputes among the joint proprietors, are the only occasions on which the interference of the canal authorities is invited or required. The contracts entered into from the 1st April, 1863, extend over two years only, and this period was purposely fixed that the date of their expiry might coincide with that of the contracts made in 1861-62.

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*Extract paras.* 21 *to* 24, *and* 31 *of review of the Government of India of Revenue Reports for* 1861-62 *and* 1862 63, *No.* $\frac{656C}{3825}$, *dated the* 15*th August*, 1864.

Para. 21.—For the encouragement of contracts for the irrigation of villages which is most desirable, a reduction of 20 per cent. might be allowed where a contract on fair terms, and for a term of not less than ten years, is taken up. A suitable reduction might be made in like manner for contracts for shorter periods.

Para. 22.—Cultivators refusing to accept these rates should not obtain any water at all.

Para. 23.—It may be remarked that the above rates are based on an acreage. Should the system of charging by the volume of water hereafter be found practicable, which however seems still very problematical, a corresponding adjustment of the rates could of course be readily made; it is believed that, in fact, the progress of events will be from a payment on an acreage by measurement to a payment of a lump sum on the ascertained average acreage for a series of years. A fixed area of irrigating opening may be found to suffice for this acreage, and the known discharge in cubic feet from this opening may then be taken as a new basis for calculating the rate of the lump sum payment for purposes of comparison. It seems very doubtful whether a system of payment by volume can ever take root excepting in this manner. The great object in all cases, however, should be to get rid of all detail measurements of land or crops, as the basis of the charge for water-rate, and the introduction of lump sum payments.

Para. 24.—The obvious advantages of a system such as is here described would be that a minimum of detailed supervision and interference would be attainable, while the establishments and charges of collection, and at the same time the chances or opportunities for abuse of power, would be reduced as much as possible. Combined with this there would be a direct encouragement of the growth of the more valuable corps.

Para. 31.—The Governor-General in Council is gratified to observe the extensive introduction of the contract system on this canal, and Major Brownlow's efforts to this end are entitled to much praise. It would have been better if the sum realised under contract had been mentioned, as distinguished from that paid on measurement of the corps. This should be attended to hereafter.

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*Extract paras.* 9 *and* 10 *from Revenue Report by the Superintending Engineer, 2nd Circle of Irrigation, of the Eastern Jumna Canal for the year* 1863-64.

Para. 9.—The following table exhibits the various sums realised on account of water-rent from contract villages on the Eastern Jumna Canal from the time that the contract system was established, and the percentage the amount bears to the gross revenue:—

| Year. | Water-rent realised under contract system. | | | Total water-rent. | Percentage of contract realisations on gross revenue. |
|---|---|---|---|---|---|
| | Kharif. | Rabi. | Total. | | |
| | Rs. | Rs. | Rs. | Rs. | |
| 1861-62 - - | 333 | 1,016 | 1,349 | 2,83,604 | 0·8 |
| 1862-63 - - | 13,871 | 13,971 | 27,842 | 2,61,731 | 10·6 |
| 1863-64 - - | 24,707 | 28,830 | 52,537 | 2,53,091 | 20·7 |

Para. 10.—These figures prove conclusively that the contract system is taking root on this canal; and Lieutenant Moncrieff writes in respect to it, that the system continues to work well, and now nearly one-fifth of the revenue is received in this way. The Zamindars, however, require to be dealt with very carefully; for, although quite willing to take as much water as they can get, over and above what they have any right to expect, they constantly come with complaints if they receive anything under the average supply. This is but natural; still it requires some discrimination to know when to allow them to break their contracts, as they occasionally wish to do, and when to refuse; for they all need to be taught that a contract is a *bonâ fide* obligation, not to be lightly entered upon or lightly broken. When the canal officer has been clearly unable to fulfil his part of the engagement, he of course cancels it; but generally when the contractors apply to have it broken, on account of some village dispute in which they themselves are often to blame, he has insisted on its holding good. Eighty-three villages have entered on new contracts during the year, and there are now 288 villages obtaining water in this manner. Most of these contracts will expire at the close of 1864-65, when they will, if practicable, be renewed for longer periods; and every effort will be made to foster and extend the system.

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*Extract paras.* 16 *and* 17 *of general remarks by Superintendent-General of Irrigation on Revenue Report for* 1863-64.

Para. 16.—I would suggest then the adoption of the following guiding rules, and I should be glad to know if Government is disposed to sanction them:—

I.—Canal-water to be ultimately sold everywhere by contract, but no contract to be forced upon the people, or hurriedly made.

* This provision was insisted on by me, as a *sine qua non*, both to prevent robbery on the part of the contractors, and on that of the establishment, as well as to obtain data for future contracts. I was also most anxious, that the opening on which the contract was made should be the one through which the water was obtained at time of contracts, so that there could not possibly be after disputes on the subject.

II.—Contracts to be based on the discharge of water per cubic foot, wherever measurement of discharge is practicable.

III.—Elsewhere contracts to be based on the average area irrigated from the water-courses contracted for, during the five (5) years preceding the making of the contract. The maximum and minimum areas irrigated during the same period being taken into account, and also the nature of the crops irrigated.

IV.—Contracts not to run for more than three (3) years till further orders.

V.—The collection of statistics of irrigation to be everywhere diligently and unremittingly prosecuted, whether the irrigation be contract or not.

Para. 17.—I have reason to believe that my predecessor, the late Colonel Turnbull, held opinions identical with my own on the points above-mentioned; indeed, he at one time fell under unmerited odium, because he held that it was not to the interest either of the country or of Government, that contracts for water per cubic foot of discharge should be forced upon the people before they were sufficiently accustomed to canal-irrigation, to be able to use it advantageously, and without regard being had to the possibility or otherwise of measuring with any approach to accuracy the quantity of water supplied. Later experience showed the accuracy of his views on this point, and removed the odium, but we long suffered under its effects; and this instance may serve to show how desirable it is that hasty conclusions on the practice of a tentative science like irrigation should be avoided, especially when they are adverse to the known opinions of a man of such experience as Colonel Turnbull, whose heart and soul were in his work.

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*Extract paras. 27 and 37 of letter from Secretary to Government, North-Western Provinces, to Government of India, No. 215A., dated 26th April 1865.*

Para. 27.—The system of issuing the water under contract had been largely extended during the year, 29·7 per cent. of the entire collections having been so made, against 13·6 per cent. in the previous year, and 0·3 in the year 1861–62, when the system began.

Para. 37.—The continuance of measurement of the area irrigated by the water issued under contract is, as the Chief Engineer represents, essentially necessary. This was noticed in the orders of the Government of India on the last Revenue Report, and should be arranged for by the Chief Engineer in the manner now recommended by him, and already laid down by the Government of India.

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*Extract paras. 14 and 15 from the Revenue Report of the Eastern Jumna Canal, of 1864–65, by the Superintendent-General of Irrigation.*

Para. 14.—Lieutenant Moncrieff writes that, "the "greater number of the contracts for irrigation entered into with villages expired at the end of last crop. Owing to the uncertainty felt as to the new water-rates, I did not attempt to renew them, and I propose leaving the question alone this crop, till the Zamindars get used to the new rates. I do not anticipate, however, any great difficulty in forming the contracts again, as they seemed generally popular."

Para. 15.—Lieutenant Moncrieff has been requested to renew all contracts where possible, the following being the lowest terms that can be accepted. The new water-rates are to be applied to the average irrigated areas of 1858–59 to 1861–62, inclusive, excluding the inferior crops which it is presumed the new rates will at first throw out of irrigation. From the sums thus obtained, 2 per cent. to be deducted as lumberdars' fees for collection, and a further reduction made of 20 per cent. as an inducement to contract. All villages declining to accept above terms to revert to payments on measured areas. The contracts to run for only three years, as the effect of new rates on the irrigation is as yet unknown.

RECEIPTS.

| Particulars. | Percentage. | Amount. | Total. |
|---|---|---|---|
| IRRIGATION - - 94·80 | | Rs. | Rs. |
| [illegible] at Re 1-8-11 - - | 73·10 | 2,55,117 | — |
| Canal fees per second at Rs. - | 0·09 | — | — |
| Direct revenue about Rs. 91 - | 18·70 | 56,674 | — |
| Total - - | — | — | 3,21,791 |

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*Extract para. 22 from Chief Engineer's, Irrigation Works, North-Western Provinces, Memo. No. 818½, dated 22nd October 1867.*

Para. 22.—The area of irrigation in contract villages has been measured this year for the first time, and the year's operations in respect to areas watered and irrigating duty may be looked on as quite abnormal. Accurate comparisons with former years are therefore not possible.

RECEIPTS.

| Particulars. | Percentage. | Amount. | Total. |
|---|---|---|---|
| IRRIGATION. 92·28 | | Rs. | Rs. |
| 134,364 acres, assessed by measurement at Rs. 2-12-10 per acre. | 84·50 | 3,76,227 | |
| 17,382 acres, assessed by contract at old rates, 242 outlets (Rs. 84 per outlet, or Re. 1-2-6 per acre). | 4·56 | 20,295 | |
| 8,410 acres assessed by contract at new rates (Rs. 2-0-10 per acre nearly). | 3·37 | 17,238 | |
| Total - - | — | — | 4,13,760 |

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*Extract para. 9 from Revenue Report of the Eastern Jumna Canal, by Lieutenant C. S. Moncrieff, R.E., 1865–66.*

*Para.* 9.—The advance of the contract system received a severe check by the introduction of the new water-rates. The greater number of the old contracts expired on 1st May, 1865. Since then 60 contracts have been entered into at the new rates, representing a yearly revenue of Rs. 23,214, based on an average area of past irrigation of 10,850 acres. The average deduction allowed from the full value of this extent of irrigation is about 18 per cent., arrived at by throwing out the irrigation of some of the poorer classes of crops, to the watering of which the new rates are to an extent prohibitory, and allowing 10 per cent. deduction, and 2 per cent. more lumberdar's dues in every case. The former contracts were given often per kolaba; but that I have been obliged to stop, owing to the difficulty of exactly determining what area has been watered from any one kolabaf—a difficulty causing constant disputes. The new contracts are all given in villages, or well-defined portions of villages, and the contractor is allowed to derive his water from where he pleases (provided no new kolabas are granted), and to water whatever parts he likes of his village lands. The total want of all co-operation among the inhabitants of any one village seems now the main difficulty. They will not decide among each other, how much each person is to pay, so that despite manifest advantages to themselves, it is only after long inducement that any will enter into contracts, except, indeed, the mahájan proprietors, who have in a few cases shown their superior shrewdness in this respect. From the new contracts taken it appears that the average irrigation per kolaba $10 \times 8$ inches is acres 71 and the average water-rates Rs. 151; but little can be made of this, as one gives as high an area as 150·5 acres and a rent of Rs. 355, while another returns but 33 acres and Rs. 85. The last wet rabi has of course been unfavourable to making new contracts.

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*Extract para. 30 from Chief Engineer's Review of Revenue Report of 1866–67, No. 621 of 1868.*

EASTERN JUMNA CANAL.

*Para.* 30.—Of the total area irrigated, 182,851 acres were assessed by measurement, and yielded a revenue of Rs. 4,60,893, which gives an average rate of Rs. 2–8–4 per acre; the remaining 56,703 acres were assessed by contract, and brought in a return of Rs. 71,571, or Re. 1–4–2 per acre. It will thus be seen that the contract rate is just one-half of the other; and that those villages, who have entered into contracts, obtain their water on terms most advantageous to themselves. The area of irrigation in contract villages was measured for the first time in 1865–66.

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*Extract para. 20 from Chief Engineer's Review of Revenue Report of 1876–68, No. 850½I.-C., dated 1st July, 1869.*

EASTERN JUMNA CANAL.

*Para.* 20.—Of the total area irrigated, 124,043 acres were assessed by measurement, giving a return of Rs. 3,36,530, at Rs. 2–11–5 per acre; and 58,501 acres were under contract, yielding a revenue of Rs. 1,25,168, or

Rs. 2-2-3 per acre. The Government received Re. 0-9-2 (or 21 per cent. on measurement rate) less for every acre irrigated by contract than it would have received if measurement had been adopted, supposing that the percentages of different classes of crops in the contract area had been the same as those in the area of measurement.

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*Extract paras. 25 and 26 of Superintending Engineer's Revenue Report for 1867–68.*

EASTERN JUMNA CANAL.

*Para.* 25.—The contract irrigation has made a great advance, and Lieutenant Harrison reports, that it is in consequence of the large number of villages which took contracts during the rabi of 1866–67. The rule adopted was as follows :—Until the lands of a village had been measured up, it was optional with the zamindars to contract from the commencement of the season (rabi, 1866–67), and the area irrigated during that season was almost the largest that had ever been irrigated : a number of villages took advantage of the opportunity. The results of 1866–67 and 1867–68 are as follows :—

| Year. | Acres. | Outlets. | Per acre. | |
|---|---|---|---|---|
| | | Rs. | Rs. a. p. | Rs. |
| 1866–67 ... | 56,703 | 736 @ 97 each, or | 1 4 2= | 71,571 |
| 1867–68 ... | 64,778 | 778 @ 161 ,, ,, | 1 14 11=1,25,168 | |

*Para.* 26.—Appendix F. shows the profit to contract villages in each zila of the canal for each season during 1866–67 and 1867–68. In the year 1866–67 the profit was Rs. 51,881-7-0 being 42·03 per cent. of the water-rate on measured area ; and for 1867–68 the profit was Rs. 27,858-12-2, or 18·31 per cent. of the water-rate on measured area. The contracts given in 1866–67 were based on the averages of the five years, 1859–60 to 1863–64, allowing a reduction of 18 per cent., which is the profit during this year.

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*Extract para. 48 from Chief Engineer's Review of Revenue Report for 1868–69, No. 362½ I.C., dated 3rd March 1871, and paras. 22 to 26 and 28 of Revenue Report, Eastern Jumna Canal, by the Superintending Engineer, 2nd Circle.*

*Para.* 48.—Mr. Anderson's remarks on the economy in distribution of water by contract, paras. 25 to 28, are very just ; but the reason why, in addition to a profit of 22·2 per cent. on the value of water taken, contract water should be given at a discount of 18 per cent. on measurement rates, is not apparent. The Superintending Engineer will be requested to show cause why this practice should not be discontinued, as the profits to be obtained apparently offer a sufficient inducement to contractors.

*Para.* 22 *of Superintending Engineer's Review.*—The water-rent revenue is derived partly from what is called "contract" irrigation, and partly from "measurement" irrigation. There is no information showing what amount of water was supplied under these two heads ; nor perhaps is it possible to give these data. By comparing, however, the rates per acre of the contract and measurement irrigation, some results worth noting are arrived at.

Para. 23.—The area irrigated, the water-rent levied, and the rate per acre of the two systems are :—

| —— | Acres. | Revenue. | Rate per Acre. |
|---|---|---|---|
| | Acres. | Rs. | |
| Kharif contract - | 32,095 | 62,070 | 1·93 |
| Rabi ,, - | 49,245 | 59,890 | 1·22 |
| Kharif measurement | 70,046 | 2,18,691 | 3·12 |
| Rabi ,, - | 122,714 | 2,58,928 | 2·11 |

Para. 24.—The proportion of the different classes to the whole irrigation under the two systems, is :—

| —— | Contract. | Measurement. |
|---|---|---|
| I.—Class - - | 32·9 | 40·9 |
| II.— ,, - - | 28·6 | 30·4 |
| III.— ,, - - | 12·3 | 8·4 |
| IV.— ,, - - | 26·2 | 21·2 |
| Total - - | 100·0 | 100·0 |

Para. 25.—The price of a contract kolaba was fixed by the average rents derived therefrom for five years, less 18 per cent., *vide* paragraph 26, Revenue Report for 1867–68. The contract irrigation revenue represents, therefore, proportionately less than 18 per cent. profit, the area irrigated from the kolabas.

Para. 26.—As the rates per acre of contract irrigation are less by 38·2 per cent. for kharif, and 42·2 per cent. for rabi, than the measurement rates, or after deducting 18 per cent. noted above, 20·2 and 24·2 ; as the prices fixed for the contract kolabas were proportioned to the area irrigated therefrom under the measurement system ; and as in a year of drought, whatever might be the case in a year when the supply exceeded the demand, water would be given proportionally to contract as to measurement kolabas, the only manner of accounting for the lower rate per acre of the contract irrigation is, that the cultivators irrigating from contract kolabas were more careful of their water, and by such action were able to make it go further than they themselves, or others, under the measurement system would have done.

Para. 28.—That the contract system is one in which the interests of the cultivator are identical with that of Government in the economical distribution of the water, is fully borne out by this year's results.

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*Extract para. 13 from Superintending Engineer's Revenue Report for 1869–70.*

EASTERN JUMNA CANAL.

Para. 13.—The decrease in the number of contracts, though small, seems strange. The returns show that Government has lost Rs. 39,242 by the contracts, or nearly 30 per cent. of what the assessments would have been under the measurement system. It is evident that there are some strong reasons for the non-extension of the contract system. It may be perhaps that the irrigators prefer paying their assessment direct to Government to paying them to a contractor, of whose honesty they have, perhaps reasonably, great distrust.

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*Extract para. 42 from Executive Engineer's Revenue Report on the Eastern Jumna Canal for 1869–70.*

Para. 42.—The area under contract irrigation and the number of contract villages, is far less than last year. This is due to several contracts having ended with the kharif crop, and the present fall was not a favourable one for renewing. Some villages have renewed since, commencing with the kharif of 1870-71, but notwithstanding the very great advantages which the contract system gives to the cultivators, they do not as a body appear to take to it much. How profitable it is may be seen from the figures given in these returns ; for whilst the water-rent per acre on land under measurement is $\frac{259,878\cdot08}{124,333\cdot19}$, or Rs. 2·09, that for land under contract irrigation is $\frac{12,526\cdot5}{7,570\cdot81}$, or Re. 1·60. This is not so favourable, however, as it was for last rabi, when the respective rates were Rs. 2·11 and Re. 1·21.

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*Extract from Superintending Engineer's Revenue Report for 1870–71, para. 22 ; and para. 16 from Executive Engineer's Report on the Eastern Jumna Canal.*

Para. 22.—The diminution of the contract outlets from 407½ in 1869-70 to 83¼ in the present year, is fully explained by the Executive Engineer.

Para. 16 *of Executive Engineer's Report.*—The diminution in the average number of contract outlets from 407½ in 1869–70 to 83¼ in the present years, requires a few words of explanation. As far as I have been able to ascertain, the distribution of profit amongst themselves was found by the zamindars of large villages a more difficult task than they were equal to. Quarrels arose, and numerous petitions were submitted to the canal officers, to the effect that the more influential men were swallowing up the profits of the contract, whilst the weaker individuals could not get their fair share. These matters not coming under Act X. of 1859 could not be settled by the canal authorities ; so in many cases they were taken into the civil courts, where law expenses further reduced their profits. Thus it happened that when the contracts of many villages expired in 1870, those with a large number of shareholders and a large area of irrigation, did not apply for a renewal.

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*Para.* 14 *from Government Resolution No.* 2,600 *I.C., dated 2nd November* 1872.

Para. 14.—*Irrigation by Contract.*—The falling off in the number of villages irrigating by contract from the Eastern Jumna Canal, noticed by the Government of India, in the Resolution on the Irrigation Revenue Report, North-Western Provinces, for 1870–71, is commented on by the Superintending Engineer, 2nd Circle. The matter is being inquired into, and will be made the subject of a separate report. Diminution of profits in wet season, and difficulties in the way of distributing them, will most probably be found at the root of the unwillingness to continue the contracts. There may be advantages to be gained by the system; but as the Irrigation Department deals with the cultivator, his interests will probably be best met by leaving him to treat for himself, and not as represented by a contracting body, in the direction of which he may have little or no voice.

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*Extract para.* 40 *from Chief Engineer's Review of Irrigation, North-Western Provinces, for* 1871–72.

*Extract para.* 11 *from Superintending Engineer's Review of the Eastern Jumna Canal.*

*Extract para.* 15 *from Executive Engineer's Report of the Eastern Jumna Canal.*

Para. 40.—Superintending Engineer (para. 11 of his report) comments on the great diminution in the quantity of water sold by contract. This matter was also noticed by the Government of India in the Resolution on the Revenue Report for 1870-71, and is being inquired into. A separate report will be submitted on the subject, as soon as all replies to references have been received. As an immediate effect of the contract system is largely to diminish the interference of the subordinate canal officials with the irrigation and assessment of the villages, the unwillingness to renew contracts shows, the Officiating Chief Engineer thinks, that this interference cannot be so very onerous and irritating as it is occasionally asserted to be.

*Para.* 11 *of Superintending Engineer's Review.*

Para. 11.—There has been a great decrease in the revenue derived from water sold under contract, due to the refusal of zamindars to renew their agreements. This decrease is greatly to be regretted, the more so as the causes are not quite apparent, for the returns show that the cultivators have benefited by the contracts in some cases (kharif, 1869-70) so much as 60 per cent.

The figures for the last five years are :—

| | Contract Rates. | Water-rent by Measurement Rates. | Profit to Cultivators. | Percentage of Profit. |
|---|---|---|---|---|
| | Rs. | Rs. | Rs. | |
| 1867–68 - | 1,25,168 | 1,53,026 | 27,858 | 22·2 |
| 1868–69 - | 1,21,985 | 1,95,942 | 73,957 | 60·7 |
| 1869–70 - | 70,646 | 1,09,888 | 39,242 | 55·5 |
| 1870–71 - | 18,820 | 26,128 | 7,308 | 38·8 |
| 1871–72 - | 8,830 | 8,955 | 125 | 1·4 |

These figures seem to prove that in ordinary seasons the profit to the irrigators is not much. This may be one of the reasons that the contracts had not been renewed. Captain Home's proposition, regarding contracts in the Saharanpur district, is good. There seems no reason why powers should not be given to the Executive Engineer to refuse water to certain portions of the district except on contracts for four or five years.

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*Para.* 15 *of Executive Engineer's Report.*

Para. 15.—The average number of contract outlets fell from 83½ in 1870-71 to 39 in the year under review; this steady decrease was remarked upon last year.

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*Extract para.* 12 *from Government, North-Western Provinces Resolution, No.* 74 *A., dated 2nd February* 1874.

EASTERN JUMNA CANAL.

Para. 12.—*Contract Irrigation.*—The results of the investigation into the failure of the contract irrigation have already been reported to the Government of India, and they confirm the correctness of the conclusions arrived at last year, that the difficulty of ensuring a fair distribution of profits is the main cause.

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*Extract para.* 46 *from Chief Engineer's Review,* 1872-73.

EASTERN JUMNA CANAL.

Para. 46.—There is a still further diminution in the contract irrigation since the submission of the last report. The causes of this change have been carefully investigated, and have been shown to be due to the impossibility of ensuring a fair division of the profits derived among the partners in the contract.

The weaker among them go to the wall, and are naturally unwilling to continue the arrangement.

No. 831 of 1878.

RESOLUTION.

FINANCIAL DEPARTMENT.

*Dated Allahabad the* 30*th October* 1878.

## THE BETWA CANAL PROJECT.

Read the undermentioned papers—

Letter from Secretary to Government, Public Works Department, Irrigation Branch, No. C 693 W., dated 19th August 1878, and annexures.

Printed Proceedings volume on the Betwa Canal Project.

Financial Department Resolution No. 1514, dated 8th July 1878.

OBSERVATIONS.—The Lieutenant-Governor having had under his consideration in this department the financial aspect of the Betwa Canal project, now records the following conclusions.

2. In 1874, this project was recommended to the Government of India (in the Public Works Department) for sanction by Sir John Strachey, then Lieutenant-Governor of the North-Western Provinces. The estimate was 40 lakhs of rupees, of which 7½ lakhs represented interest charges. The estimate has since been revised, and the total expenditure on construction now stands at 25½ lakhs, to which two lakhs must be added for "indirect charges." This is exclusive of the interest charges. In the Irrigation Department budget for 1878-79 the estimate appears as Rs. 24,94,969; but this does not include the cost of the temporary weir or the "indirect charges." Allowing for these omissions, the two estimates are virtually identical.

3. The success of the canal depends upon a number of considerations, in regard to which it is impossible to make confident assertions; but after studying the lengthy correspondence extending over several years, in which all the officers of the Revenue and Irrigation Departments took part who were capable of contributing information that threw light on the problems involved, and in which every element in the question was as thoroughly elucidated as it could be, the Lieutenant-Governor thinks that the following conclusions may be considered to be established beyond any reasonable doubt :—

(*a.*) The country to be irrigated from the canal is periodically devastated by famines, which the supply of water for irrigation would in a great measure avert.

(*b.*) Such a supply would be specially valuable in years of early cessation of the rains, when the ground becomes so hard that it is impossible to plough it, and so dry that, if it can be ploughed, the seed sown fails to germinate.

(*c.*) Owing to the character of the soil, wells are too expensive to be made in any number, and when made cannot be depended on to yield the necessary supply of water.

(*d.*) Though it is still questionable how far water will be taken for the irrigation of *mar* soil, this point may be left out of consideration, as by far the greater part of the area commanded by the canal consists of soil the irrigability of which and need of water for which are beyond doubt.

(*e.*) The best authorities are convinced that, though the present system of cultivation, which is rendered imperative by the uncertainty as to the water supply when it is dependent solely on the rainfall, must be changed before the canal can be expected to pay, a change will certainly take place when the supply can be depended on, and that, in short, the practice will be adapted to the existing conditions.

(*f.*) The whole of the irrigation from the canal will be flush, and there being a demand for water, there is fair ground for the opinion, advanced by the Board of Revenue, that the rates now paid for water on the Ganges Canal, which do not much exceed those paid for water taken from the Bundelkhand lakes, can be expected to be realised.

4. Accepting these conclusions, which were acquiesced in both by Sir William Muir and Sir John Strachey, the further questions that have to be considered are—

1*st.* What volume of water will be available for irrigation from the canal, and what revenue it may be expected to yield?

2*nd.* To what extent can it be depended on in the event of the failure of the rains?—

3*rd.* What will be the financial results of the canal, and what relation will the probable income bear to the cost of construction and management?

4*th.* How far can provincial revenues provide for the payment of interest on the capital expended?

5. For the determination of the first of these questions, the most important data are those contained in the note by the Chief Engineer, dated 19th August 1878. Taking the results of the observations of the discharge of the river during seven years, the Chief Engineer is of opinion that they are sufficient to prove that in ordinary years the canal will carry—

| | | | |
|---|---|---|---|
| 200 cubic feet | - | from | 1st March to 1st July. |
| 600 ,, | - | ,, | 1st July to 1st October. |
| 600 ,, | - | ,, | 1st October to 1st March. |

Applying to this volume the duty and rates of the Eastern Jumna Canal, the result is an irrigated area of 98,486 acres and a gross revenue of Rs. 2,37,800. This conclusion appears to be supported by the data that have been registered; and, considering how retentive the Bundelkhand soil is, it would have been not unreasonable to assume a higher duty than in the case of a Doab district.

6. How far the supply will be maintained in years of very deficient rainfall is a more difficult problem. The Betwa is not fed, like the Jumna and Ganges, from the snow of a great and lofty mountain range, but is entirely dependent on the rainfall. There is no reason, however, to suppose that in any year this supply will totally fail: on the contrary, the observations of 10 years show that, though there will be seasons of low supply, the canal will fairly, under any circumstances, meet the calls upon it. In considering this point, it is not the discharge of the river, but the quantity stored in the reservoir that has to be looked to. In 1877, the year of least recorded rainfall, when the whole of the provinces suffered from drought, the reservoir would have yielded a full supply for the kharif, except in 10 days, from 21st to 30th June, and seventh-tenths of the full supply in the rabi. Again, in 1878, when the holding off of the rain caused great anxiety and distress, the fall of rain in the previous cold season, after which irrigation would have ceased, would have so filled the reservoir that the kharif would have commenced with nine-tenths of a full supply. The results of the observations during the last 10 years seem, therefore, to show that the Betwa can be depended on, even in years of deficient rainfall, to yield a fair supply, doubly valuable at such a time. Taking the years for which complete records exist, the chief engineer shows that the average direct income, deducting working expenses, if the canal had been completed, would have amounted to Rs. 1,11,960. This is exclusive of indirect revenue, which, though it will eventually accrue, cannot be expected until the canal has been in full operation for some time and rents have risen. The amount of indirect revenue may for the present also be left out of consideration, as there is room for uncertainty as to how much it may be, and in any case the estimate should for several reasons not be pitched high.

7. The financial position of the project, taking the estimate of gross direct returns, may be stated as follows:—The canal will cost Rs. 25½ lakhs (omitting the indirect charges): it will take three years to construct: in the 10th year it will reach its full working power. It is assumed that the Government of India will find the money, and that the province, agreeably to the arrangement of April, 1877, will pay interest at 4½ per cent. on the capital. In the first year the charges for interest will be Rs. 18,000; in the second, Rs. 54,000; in the third, Rs. 93,375; and in the fourth, Rs. 1,14,750. The canal by this time will be completed; it will henceforth begin to bring in revenue, but it will also incur working expenses. The working expenses are put at Rs. 1,00,000 per annum, which seems a reasonable figure. The province will thus be liable for Rs. 2,14,000 per annum on account of interest and working expenses. For the first working year the earnings are put at Rs. 20,000, and they are assumed to increase each year by Rs. 30,000, until the 10th year—*i.e.*, the 13th from date of beginning work—the average direct income will reach Rs. 2,12,000, thus falling short of the total of working charges and interest by Rs. 2,750. The balance of charges against the canal, after deducting all earnings, at the end of the 13th year will therefore be nearly 10 lakhs. This is the sum which during the 13 years will have to be found from provincial resources. Thereafter the annual deficit would be Rs. 2,750; but this and the interest on the indirect charges would probably be covered by the indirect returns.

8. This burden is one that his Honour hesitates to affirm that provincial resources can bear. His Honour is convinced that the canal is urgently required; that its construction must in future years add greatly to the security of the isolated and backward Jhánsi division from the effects of drought; and that the indirect benefits in preventing distress, in saving Government revenue, and in promoting general prosperity, will be great; but it does not appear to him that the direct money return will be so great as to justify him in guaranteeing from provincial revenues the regular payment of the required interest. This character of the project was not lost sight of by Sir John Strachey. In recommending it to the Government of India in 1874, he said that he did not anticipate that "these works will financially prove "directly remunerative within any time which can now "be foreseen." He recommended the project simply as a protective work against famine. Since that opinion was recorded, the estimate of expenditure has been considerably reduced, and the prospect of a remunerative income has been proportionately improved; but, on the other hand, very serious burdens have also since then been laid on provincial funds. The liabilities on provincial finances in connexion with light railways, completion of existing canals, drainage schemes, famine relief, and such like, have been greatly enhanced. The share of the license tax to be made over to the provinces is still undecided, and until this is done his Honour has no means of knowing what money is at his command to meet the heavy liabilities in connexion with existing canals.

9. But his Honour, while not prepared to give a guarantee that provincial funds can provide for the cost of the scheme, is decidedly of opinion that it ought not to be abandoned. It seems to him that the Imperial Government, as the great landlord and directly interested in the prosperity of the agricultural community, and in whatever secures the land revenue, might well undertake a project which will unquestionably subserve and promote these objects, and that it ought to be carried out and worked with funds supplied from the Imperial exchequer.

No. 1630A. OF 1878.

RESOLUTION.

FINANCIAL DEPARTMENT.

*Dated Allahabad the 23rd December*, 1878.

## THE KEYN CANAL PROJECT.

READ the under-mentioned papers :—

Resolution No. 831, dated 30th October, 1878, on the Betwa Canal project.

Printed Proceedings Volume on the Keyn Canal project.

Memo. from Officiating Secretary to this Government, in the Public Works Department, Irrigation Branch, No. C 816 W., dated 11th September, 1878.

Financial Department, Resolution No. 1,514, dated 8th July, 1878.

OBSERVATIONS.—The object of the canal is to irrigate the portion of the Bánda district lying between the Keyn and Baghin rivers, amounting to one-third of the whole district. The supply of water is to be secured by constructing a weir 63 feet high across the bed of the Keyn at Keroni. This weir and first two miles of the canal will be in foreign territory. The estimated cost of construction, including 2½ lakhs for indirect charges, is in round numbers 46 lakhs of rupees.

2. The canal is calculated to supply, in the most unfavourable seasons, 400 cubic feet of water per second, available during both the rabi and kharíf. The irrigable areas are estimated as under :—

| | | |
|---|---|---|
| Kharíf - - - - | 400 × 87 | = 34,800 |
| Rabi - - - - | 400 × 135 | = 54,000 |
| Total - - - | | 88,800 |

giving an estimated income from occupier's rate of Rs. 2,48,000 for both harvests. These factors—of area, duty, and rate—are based on the Eastern Jumna Canal returns for 1875–76 (an ordinary year); and it is stated that in the retentive soil of Bánda a higher area factor may confidently be looked for. On the same basis, the income from mills is put at Rs. 4,470, and from miscellaneous receipts at Rs. 2,530. Thus the total direct income is raised to Rs. 2,55,000; while the indirect income (owner's rate, calculated at one-third of occupier's rate) is put at Rs. 83,000. Deducting working expenses (in round numbers Rs. 75,000), the total net direct income would be Rs. 1,80,000. This would give a return on direct charges of 4·15 per cent., and on direct and indirect charges of 3·9 per cent. Including indirect income, the percentage of return would be 5·7.

3. The canal will, it is expected, take four years to construct; it will reach its full working power in 10 years, and its full paying power in 14 years. The charges (taking direct expenditure and direct income only into consideration), commencing with Rs. 22,500 in the first year, will reach a maximum of Rs. 2,50,000 in the fifth, after which they will decrease till they reach a minimum of Rs. 15,000 in the 14th year. If indirect income and indirect expenses be included, the charges, commencing with Rs. 22,500 in the first year, will reach a maximum of Rs. 2,56,000 in the fifth, after which they will decrease; and from the 12th year there will be a surplus which will amount to Rs. 56,000 in the 14th year.

4. As regards the volume of water available, no data have been given to show how, in the case of a total failure of the rains, the supply of 400 cubic feet per second of water could be kept up after the end of June. Observations made from 1869 to 1873 show that from July to October the river is in flood; from November to January the discharge exceeds 400 cubic feet; in February it is about 400; from March to June inclusive the average per month is only 139·61. In ordinary years this deficit could easily be made up from the reservoir, allowing a margin for evaporation and absorption. The officiating chief engineer has, however, assured the Lieutenant-Governor that the permanent supply of the Keyn is more to be relied on than even that of the Betwa river, and that there is no reason for apprehending a failure of the supply, even when the rains are deficient.

5. The administrative side of the question has been fully considered, and the decision come to was that the canal would be highly advantageous to the tract of country concerned. Admitting this to be so, it remains to be seen how far the financial department may accept the figures summarised in the preceding paragraphs, and what is the conclusion to which these figures point.

6. The Irrigation Department, in estimating direct income, assume the applicability of the Eastern Jumna Canal rates—Rs. 4 in the kharíf and Rs. 2 in the rabi. But it is observed that so high an authority as Colonel Brownlow (who only allowed for 300 cubic feet and a duty of 70 acres) put his initial rates at Re. 1-4-0 and Re. 1; while the late Mr. Mayne, C.B.—a strenuous promoter of the scheme, and an experienced officer with great local knowledge—urged the necessity of imposing low rates at the outset. These views deserve respect and consideration. The rates now estimated for by the Irrigation Department would certainly not be realised at first, because they assume that certain crops (sugarcane and rice) will be grown which are not at present cultivated—mainly, no doubt, owing to deficient water-supply. If these crops are grown, his Honour does not see why an average kharíf rate of Rs. 4 for flush irrigation should not be obtained. But, on the other hand, there is no certainty that these crops will be cultivated; and Sir George Couper considers that it would be safer, in making an estimate based on existing facts, to assume that only Rs. 3 will be realised as an average kharíf rate. This is in accordance with the view expressed by Colonel Greathed in para. 25 of his memo. of 1st April, 1874, and the Lieutenant-Governor thinks the conclusion may be accepted as reasonable. Similarly, Rs. 2 may be assumed for the rabi. These rates give the following direct income, on the basis of this assumed area and duty :—

| | | Rs. |
|---|---|---|
| Kharíf, | 34,800 acres (a | Rs. 3 = 1,04,400 |
| Rabi | 54,000 acres (a | ,, 2 = 1,08,000 |
| Total - - | | 2,12,400 |

7. In the case of the Betwa Canal the indirect returns were left out of account; but it is only fair to point out that in the Keyn project enhancement of revenue will be possible—in the form of owner's rate—which should be taken into account. His Honour is of opinion that 12 annas per acre may safely be assumed for this—a yield of Rs. 66,600 per annum; and the total income is thus Rs. 2,79,000, or Rs. 2,86,000, including mills and miscellaneous. Deducting from this working expenses (estimated at Rs. 75,000) there is left a surplus of Rs. 2,11,000. The charge for interest on direct charges is Rs. 1,95,000, and on direct and indirect charges Rs. 2,07,000. While, therefore, the canal would ultimately yield an income equal to interest on capital expended, and leave a small surplus, it would not be able to meet the deficit accruing yearly while the works are in progress and till it attained its full working power. As a set-off, on the other hand, against this, there must be put the great benefits derivable from the canal as preventing great loss of revenue caused by periodical droughts; as arresting the gradual and general decay of the agricultural interest; and as anticipating, and thus rendering unnecessary, future expenditure on famine relief.

8. The conclusion arrived at by His Honour to the Financial Department is that, if the Betwa Canal be found to be a success, it would be a wise and politic measure, in the interest of the Imperial revenue, and in view of the general welfare of the community, to construct the Keyn Canal on the analogy of the Betwa works; but His Honour is not prepared to recommend that it should be undertaken, with its enormous weir and problematic returns, until the smaller project is completed, is in working order, and is shown to be financially sound.

## BENGAL.

*Note by Colonel Haig, Chief Engineer, Irrigation Branch, P. W. Department, on Irrigation and Communications in Bengal.*

1. The points upon which I am required to furnish information, in respect to Bengal are as follow :—

(1) the area now irrigated or irrigable from different sources of supply;

(2) the extent to which such irrigation protects from drought the food-crops of the district in which the works exist;

(3) the possibility of extending irrigation still further—
  (*a*) by the improvement of existing works;
  (*b*) by the creation of new works;

(4) the obstacles to such extension arising from—
  (*a*) any kind of administrative inefficiency;
  (*b*) the poverty and want of enterprise of the ryot.

2. With regard to the first of these heads, paragraph 4, page 20, of Mr. Toynbee's note affords about as full and correct a reply as could be given. It amounts to this, that there are really no reliable statistics whatever of the areas protected by wells and tanks. As far as Bengal proper is concerned, this is not a matter of any consequence, for there there *are no wells*, the whole of the drinking water being obtained from tanks; and as the tanks are all excavated, not formed by throwing dams across hollows and so impounding the drainage, it is plain that the quantity stored can be little more than is required for domestic purposes, for the cost of storing water on such a system must utterly forbid its use for irrigation.

In Behar there are both wells and tanks; the latter are formed by throwing up low bunds across the smaller drainages. They are of use in years of fair rainfall, but invariably fail when drought occurs. They are therefore almost useless as a protection against famine.

With the wells it is otherwise. These abound in South Behar, and are found all over the Shahabad, Gya, and Patna districts, where wherever the soil is firm they can be sunk to depths of 20 to 30 feet, with little or no support to the sides. They afford a certain supply of water in all years, but the quantity is considerably reduced when any serious failure of the local rains occurs. Last year, for instance, the wells in parts of Shahabad failed to such an extent that the ryots had difficulty in getting from them even the small quantity of water required for the poppy cultivation. Mr. Toynbee puts the area protected by this means at 600,000 acres. This is a mere guess, but I am inclined to think a tolerably fair one. The area might perhaps in bad years be as low as 400,000, but I hardly think below that.

3. In North Behar, that is to say, in the tracts to the north of the Ganges, viz., Sarun, Chumparun, Tirhoot, Bhagulpore, Purneah, there are very few wells, though the spring-level is there generally very much nearer to the surface than in South Behar, being from 10 to 15 feet only below ground. The soil is generally loose, and the wells therefore more troublesome and expensive to make. Whatever the cause may be, the absence of wells in this great tract is certainly remarkable. Even in years of greatest scarcity of water the people seem surprisingly slow to resort to wells for a supply, though it may not be necessary to go deeper than 10 to 12 feet to find it.

4. With regard to canals, when the three large schemes now in hand are completed, as they very soon will be, to the extent sanctioned, they will supply irrigation in the very driest years to the following areas :—

| | Acres. |
|---|---|
| Orissa - - - | 180,000 |
| Midnapore - - | 50,000 |
| Sone - - - | 1,100,000 |
| Total - | 1,330,000 |

There are also two smaller schemes projected or in hand in Sarun and Hooghly which will afford irrigation to about 170,000 acres. Thus the total area irrigable by canals would amount to 1,500,000 acres. It will presently be seen to what extent this area may be increased by the extension of the sanctioned works. That under the Sone canals, however, includes at least 500,000 out of the 600,000 acres watered by wells, as the ryots universally abandon the wells for the cheaper canal water when they can get it.

5. In addition to the protection afforded by canals and wells, there is no doubt that a very considerable area, which it is quite impossible to estimate, is more or less protected even in the worst years by the spill from the great rivers and some of the small local streams.

The Gunduk probably rises in all years high enough to admit of a very important quantity of water being drawn off through sluices in its embankments for the irrigation of the lands inside. The overflow of the Ganges on both banks in the districts below the confluence of the Gunduk generally irrigates and enriches with deposit a vast area along a length of 400 miles. This overflow, however, cannot be depended upon in years when drought is general throughout Upper India, and I believe it did not take place in 1873 or 1875, both very bad years.

The smaller hill streams, however, probably do afford irrigation to the crops of a considerable area even in the driest years. One characteristic of those debouching on to the plains of the Ganges from Nepal on the north, and the Kymore and other ranges to the south, of the river, is that, after entering the plains, their channels gradually diminish in size or split up into a number of smaller channels, and so, in many cases, at last are lost altogether, the flood-waters escaping over the whole face of the country. Thus every heavy fall of rain in the hills causes an inundation of greater or less extent in the plains. Even if the rivers do not overflow their banks, the people dam them at numerous points and draw off the water by side-cuts. This is the case in the northern parts of Tirhoot, Bhagulpore, and Gya. In the very worst years there can be no doubt that a considerable extent of the rice-crop is preserved in this way, but it is quite impossible to give any figures.

In Orissa the floods are as often destructive as beneficial, so perhaps no account can be taken of them as a means of irrigation. On the whole I should say it may pretty safely be reckoned that in those parts of Bengal and Behar where protection against failure of the local rains is necessary, about* 1,700,000 acres are, or rather will be, when the present irrigation schemes are completed, secured by all the different means I have described. The next question is what proportion this area bears to the total area dependent upon the local rainfall for maturing its food-crops.

6. Throughout Assam, and all the great alluvial tracts in the estuaries of the Brahmaputra and Ganges, and in Chittagong, the rainfall is never so deficient as to cause any serious failure of the rice-crop. What with rain and general inundation there is in the very worst years a surplus for exportation.

A line drawn down the Northern Bengal State Railway and continued along the Eastern Bengal Railway to Calcutta and the mouth of the Hooghly, would probably divide with sufficient accuracy the naturally protected from the unprotected tracts, all the country to the east of this line being safe in all years, and that to the west more or less unsafe, in respect of its food-supply. The latter tract comprises a gross area of 105,000 square miles, or about 67,000,000 acres, of which 35,000,000 are under food-crops, with a population of 46,000,000 souls.

7. Calling this, for convenience sake, the unprotected area, the next thing is to distinguish between those parts of it which are most liable to drought and those which are more favourably situated. This is easily done. The former comprises (1) a tract lying along the borders of Nepal and extending from the Gunduk on the west as far as the Kosi, and perhaps the Northern Bengal Railway on the east, having a length of some 250 or 300 miles and a breadth of about 50 miles; (2) the Orissa deltas and parts of the hill tracts above them.

Of these two divisions of the tract most exposed to drought, I should say that the first has suffered the most from this cause in the past. More prominence has been given to the case of Orissa from the circumstances connected with the famine of 1866 in that province which attracted so much public attention. Orissa also being temporarily settled, remissions of revenue there have been frequent and present a long array of facts in illustration which are entirely wanting in the case of per-

* Namely—

| | Acres. |
|---|---|
| Canals - - - | 1,500,000 |
| Wells - - - | 100,000 |
| Hill streams, &c - - | 100,000 |
| Total - | 1,700,000 |

manently-settled Behar. But these remissions have been nearly as often for damage by floods as for loss of crops by drought, and setting the famine that would have been in Behar, but was prevented, in 1873–74, against the famine which was not prevented in Orissa in 1876–77, it seems to me probable, as far as I have been able to make myself acquainted with the history of both provinces in the past, that upon the whole North Behar has been the severest, most frequent, but least heard of sufferer of the two.

The areas of the two divisions may be thus stated—

| | Sq. miles. |
|---|---|
| North Behar - - - | 12,000 |
| Orissa - - - - | 8,000 |
| Total - - | 20,000 |

Thus the tract most liable to famine would amount to 20,000 out of 1,05,000 square miles, or about one-fifth of the latter, and its population to about 9,000,000 out of a total of 46,000,000.

8. The acreage of food-crops in the two tracts would appear to be*—

In North Behar and North Bengal—

| | Acres. |
|---|---|
| All Chumparun - - - | 1,308,000 |
| ¾ Tirhoot - - - - | 2,760,000 |
| ½ Bhagulpore - - - | 1,168,000 |
| ½ Purneah - - - - | 650,000 |
| ½ Dinagepore - - - | 675,000 |
| Total - - | 6,561,000 |
| Orissa - - - - | 2,424,000 |
| Total area under food-crops in the tracts most exposed to famine - | 9,000,000 |

9. Summarising what has now been said under this head we have—

| | |
|---|---|
| Total area under food-crops in the districts liable to drought - - | 35,000,000 |
| Of the above, area of food-crops in districts most exposed to famine - | 9,000,000 |
| Area which will be irrigable in all years when the sanctioned irrigation schemes are completed, including that irrigable by wells and hill streams - - - | 1,700,000 |
| To which I may add, area that was actually irrigated effectively in the famine year 1873–74, probably - | 700,000 |

10. The next question raised by the Commissioners is, what is to be understood by the term "protection," *i.e.*, for what proportion of a given area must irrigation be provided in order to secure the whole against famine? It is stated that "it has hitherto been held in the "Irrigation department, that an area is 'protected' of "which a third part is, or can be, irrigated in a season "of drought by a canal drawn from a permanent river, "or by wells not liable to dry up."

Taking Bengal as a whole, including Behar and Orissa, we have the following figures :—

| | Acres. |
|---|---|
| *Total* area under food-crops - | 48,634,000 |
| Area secured in all years in the Eastern districts - - - | 13,634,000 |
| Area more or less liable to drought | 35,000,000 |
| Of the foregoing, area that will be irrigable by canals and wells when the sanctioned schemes are completed - - - | 1,700,000 |

According to this calculation, Bengal, as a whole, may be said to be "protected" in the sense of that term mentioned by the Commission, and if only proper means of cheap and general distribution existed throughout the province, famine ought to be impossible.

As a matter of fact, however, in 1873–4 an immense portion of the province was threatened with famine, and was only saved by the importation of a large quantity of food and a very heavy outlay on relief-works.

It is probable, therefore, that the facts of that year may afford the best available test of the extent to which Bengal was then "protected," and of the accuracy of the hitherto accepted departmental definition of that term.

11. In proceeding to investigate this part of the question, I adopt Sir Richard Temple's figures. It has been asserted that famine relief was overdone on that occasion; if so, any conclusions which may be drawn from the recorded facts as to the measures necessary for the prevention of of future visitations of a similar kind, will only err on the safe side. I can only take the figures as I find them; no others are available. Those who think too much was made of the famine, and that the relief operations were altogether in excess of what was required, may make their own modifications of my inferences. For my own part I do not believe in the possibility of effectually averting famine, when suddenly and unexpectedly threatened, without enormous waste. The mistake is leaving the country in a state in which famine is possible at all.

12. It appears, then, that in 1873–74 the province was threatened with famine over as large an area as that which suffered so fearfully a century earlier. The distressed tracts included the whole of Behar, Northern Bengal, and parts of Central Bengal and of Chota Nagpore. Their area amounted to 40,109 square miles, and the population affected (only a part of the total population of this great tract) to 17,764,000. The "very distressed" portion of this tract covered an area of 20,950 square miles, with a population of 10,700,000. The failure of the rains was such that "over the greater "part of Bengal proper (containing about 28 millions of "souls) there was from one-half to three-quarters only "of a full average crop; while in North Bengal and "Behar (containing a population of 26 millions) the "yield of the food-crops was estimated to be from one-"quarter to one-third of a full average year." This description has reference to the autumn and winter crops of 1873. The spring crops of 1874 were generally fair, excepting in Western Bengal, where the outturn was bad. In Northern Bengal the spring harvest was indifferent, but there the spring crops contribute not more than one-eighth of of the food-supply of the country.

For all practical purposes it is probably unnecessary to contemplate any more widespread failure of the crops than this. There was, however, actually no famine, though prices rose to double their ordinary amount, and there was no doubt much suffering among certain classes. The relief measures instituted by Government and the large importations of food, both by Government and by private traders, were sufficient to prevent starvation or probably even very acute distress.

13. The means of distribution were extremely imperfect. There was, indeed, the great trunk line of the East Indian Railway, on which the whole of the transport operations from Calcutta and Eastern Bengal and from Northern and Central India into the dirtressed tracts almost solely depended. But branch lines there were none until one short line, about 50 miles long, to Durbungah was constructed, and the district roads were few and unsuited to any heavy traffic. There can be no doubt that if a similar emergency should arise a few years hence, even with no greater breadth of land under irrigation than in 1873–74, there would be very much less need of Government interference in the distribution of food, and a much smaller outlay for this purpose would be necessary than in that year. Had the Northern Bengal State Railway been then in existence, the relief-operations in that part of Bengal might have been greatly curtailed, while a vast expenditure in transport by cart and bullock in Tirhoot and Bhagulpore would have been saved had the Durbungah and Tirhoot lines with their contemplated extensions been in operation.

14. The importations of food into the distressed districts were as follows—

| | Tons. |
|---|---|
| By Government - - - | 460,000 |
| By private traders - - | 529,000 |
| Total - | 989,000 |

But of this quantity 105,000 tons of Government grain remained unexpended at the close of the distress, so that the actual quantity required to meet the wants of the people was 884,000 tons.

Of this quantity, 226,000 tons came from Upper and Central India by rail, 368,000 tons from Southern and Eastern Bengal, and 290,000 tons were imported by Government from Burmah.

15. It appears then that in 1873–74 Bengal, with nearly one-third of the whole of its food-crop area secured either by an unfailing rainfall or by artificial irrigation, failed to supply the wants of its population by 516,000 tons. It would be more correct to say that

* See return appended to Mr. Toynbee's note.

this failure occurred with open ports and an unrestricted export trade, for it should be noted that, in the year under review, 222,576 tons of rice were exported from Calcutta alone, and 151,597 tons in 12 months from October 1873, when widespread failure of the food-supply was certain, to October 1874 when the distress was at an end.

As a fact then, although about one-third of the total area of food-crops of Bengal was secure from drought in 1873–74, famine was only averted by the interference of Government at an enormous outlay and the importation of 516,000 tons of grain from without. It follows that in the then existing state of the communications, the province was not "protected" by the irrigation (natural and artificial) of one-third of its area, the naturally irrigated tract being almost entirely in one large compact block situated from 500 to 700 miles distant from the actual scene of distress.

16. The question then arises, what would be the state of things were a similar failure of the rains to occur a few years hence when the present irrigation schemes will have been completed, branch railway lines constructed penetrating the greater part of North Behar (the scene of most of the distress), the Northern Bengal line in full operation, and the coast canal, which will connect the Orissa deltas with the Hooghly, completed.

In the first place there would be 1,000,000 more acres under irrigation (supposing the whole irrigable area to be irrigated, which is, however somewhat doubtful) than in 1873–74, and the additional yield of this area of food crops over and above that of 1873–4, taking the latter at that of a six-anna crop, and that of irrigated land at a fourteen anna crop, would be 264,000 tons of rice or other clean grain. There would still remain a deficiency of (516,000—264,000 =) 252,000 tons, and the next question would seem to be whether the extended and cheapened means of inter-communication throughout the province might not be depended upon to bring this quantity to the scene of scarcity from the districts where rice is plentiful. It is curious to note how very small a fraction of the total food supply of the province seems to make the difference between sufficiency and dearth. An average of 10·5 maunds 840 lbs.) of rice or clean grain per acre will be admitted to be a very moderate estimate of the yield of the food crops of Bengal. Calculating on a total area of 48,634,000 acres, this would give a total annual outturn of 18,210,000 tons. Now, the quantity by which the food-supply fell short of the requirements of the population in 1873–74 was, as we have seen, 516,000 tons or only 2·8 per cent. of the outturn of an average year. But the food-stocks in hand alone, over and above the crop of the year, must have been in January 1874, 3,640,000 tons, if Mr. McDonnell's estimate for Behar of one-fifth the annual consumption is to be taken, and it seems very moderate). So that, with stores of grain amounting to 3,640,000 tons in hand, the province could not spare, or prices did not rise enough to extract 516,000 tons to meet the deficiency of the year. Either, it would seem, the common estimates of the stores of grain in the country are utterly wrong, or these great reserves are never drawn upon, and are therefore practically unavailable, until prices have risen to an extreme famine pitch. In Behar, in 1873–74, prices never seem to have risen above 10 seers per rupee, the rate at which the Government grain was sold, and which therefore regulated the markets. If Government had not imported grain, but left the supply entirely to private enterprise, could Bengal have furnished it, even with the cheapest means of transport? Apparently not, for during the period of greatest scarcity and distress viz., from April to October, 1874, prices at Backergunge, in the very heart of the great rice producing districts of Eastern Bengal, were very nearly the same as in Patna, and during the last three months of that period actually higher. Patna prices where perhaps three seers below those prevailing in the districts on the north bank of the Ganges, but this difference would not have paid a merchant to import from Backergunge. It seems plain that, as far as 1873–74 is concerned, improved and cheapened intercommunications in Bengal would not have much ameliorated the state of things in Behar, for in Orissa alone were prices very much lower than elsewhere. I should conclude therefore that, even with an additional irrigated area of 1,000,000 acres, very severe scarcity and distress might not be impossible.

At the same time, and without in the least presuming to enter into the question of how far famine would, in the absence of relief measures, have prevailed in 1873–74, or whether these measures were overdone or not, I must confess the prices of rice throughout the year of distress, at such an important centre at Patna, do look very much as if a diminution of 252,000 tons out of 884,000 imported would not have much aggravated such distress as there was. The administration reports for 1873–74 and 1874–75 show that the price never rose above 13 seers per rupee, was more frequentiy 14 seers, and sometimes 16 and 17. Looking at what prices have been in Madras during the last two years and what they are (9 to 10 seers) even at this moment, it is hard to understand how any such rates as those in the margin could be compatible with severe and widespread distress.

| | | Backergunge. | Patna. |
|---|---|---|---|
| September | 1873 | 26 | 16 |
| October | „ | 25 | 14 |
| November | „ | 17·5 | 13 |
| December | „ | 13·13 | 14·6 |
| January | 1874 | 17·8 | 12·12 |
| February | „ | 13·4 | 13·2 |
| March | „ | 16 | 12·8 |
| April | „ | 16 | 13 |
| May | „ | 14·8 | 13 |
| June | „ | 13 | 14 |
| July | „ | 14 | 14 |
| August | „ | 14·4 | 16 |
| September | „ | 14 | 15 |
| October | „ | 13 | 15·8 |

It must, however, be remembered that, notwithstanding the comparative moderate prices which prevailed throughout Behar in 1873–74, the people were only enabled to purchase food by means of the relief works opened by Government at a nett outlay of probably 2,000,000*l.*, that is to say, it was necessary to throw that quantity of money into the country to replace in part the losses sustained by the ryots in the partial or total destruction of their crops. The county could not therefore be regarded as effectually protected from famine if it were merely in a position to raise by means of irrigation as much more food as was imported from other provinces in 1873–74, for, in that case, relief in the shape of money would still have to be given through importation and distribution by Government might be unnecessary. There must be in all years such a proportion of the cultivated area secured from the effects of drought as will provide in the worst years such an ample supply of food that prices could never rise to such a point as to require that the State should supplement the private means of the people. The Commission suggest for inquiry the question how far the assumption, that the irrigation of a third of the area would be sufficient for this purpose, is applicable to Bengal. I give below a few calculation bearing upon this point, and upon the facts, so far as they are known, of 1873–74.

17. The total area of the tract affected by drought is stated by Sir Richard Temple to have been 40,000 square miles, and the population 17,764,000. This is not the total population of that area, but only, but only of those portions of it in which distress more or less prevailed. The area of food-crop corresponding to this population, assuming the same proportion as for the whole of Bengal, would be about 15,000,000 acres. This, then, we may take as the extent of food crops imperilled in an extreme year such as occurs only once in a century.

I adopt Mr. McDonnell's estimate of 7·46 maunds (596·8 or say 600 lbs.) per head as the quantity of rice or other grain required for food and seed per head per annum. At this rate the quantity required for 17,764,000 persons for one year would be 4,758,000 tons, and the reserve stock ordinarily stored would be one fifth of this or 951,000 tons. We have then—

| | Tons. |
|---|---|
| Stock in hand at close of 1873 - | 951,000 |
| Imports in 1873–74 - - - | 884,000 |
| Total - - | 1,835,000 |
| Requirements, or the year - - | 4,758,000 |
| The crops of the year must have yielded - - - | 2,923,000 |

Again—

| | Maunds. | Tons. |
|---|---|---|
| Yield in clean grain (rice or other grain) of a *good* average year (McDonnell; a 12 anna crop) - - - | 11·2 | = 0·4 |
| Average of good and bad years (10 anna crop) - - | 9·33 | = 0·333 |
| Irrigated crop (14 anna) - | 13·00 | = 0·467 |

The above figures are chiefly applicable to Behar, in which province almost the whole of the distressed districts lay. For Lower Bengal the yield would be slightly different. According to these rates a yield of 2,923,000 tons from 15,000,000 acres would be a six anna crop only, and that therefore would be the average for both khurref and rubbee for the whole distressed area in 1873–74. Looking at the description given by Sir Richard Temple and in the Administration Reports of the outturn in that year, setting off the generally fair and sometimes good rubbee crops against the bad khurreef said to be four annas only in many districts), the above seems to me a likely estimate.

18. If one-third of the crops of the distressed area, or 5,000,000 acres, had been irrigated the yield would have been (14 anna) 2,335,000 tons. If the actual crop in that area was only a six anna one (—941,000 tons) as above estimated, irrigation would have added 1,394,000 tons of food to the general stock. This quantity, added to 2,923,000 tons, the actual outturn of 1873–74, would make a total of 4,317,000 tons, or nearly the ordinary requirements of the people which we have taken at 4,758,000 tons. In other words there would be in the very worst years an ample supply of food for all the wants of the province. We have, however, already seen that in 1873–74 Eastern and Southern Bengal sent 368,000 tons into the distressed districts, and to this extent at least the additional supply to be raised by irrigation might be reduced. This quantity corresponds at the difference between a six anna and a 14 anna crop, to 1,400,000 acres. Adding to this the area irrigable by wells and streams, or 600,000 acres, the total is 2,000,000 acres, which, deducted from 5,000,000 acres, leaves 3,000,000 for which irrigation would have to be provided by other means in order to "protect" Bengal from famine. If it be said that all that this would do would be to provide the food required, while there would still remain the difficulty of the loss of purchasing power consequent on the failure of the crops in the unirrigated area which must be met by some means or other, the answer seems to be (1) that there must be some points where irrigation shall stop short of the total area threatened; (2) that the value of the increased produce on 3,000,000 acres of irrigated land in ordinary years would be 2,500,000*l.* (the difference between a 10 anna and a 14 anna crop at Rs. 2 per maund of clean grain), an addition to the wealth of the agricultural classes so enormous that they could not fail to accumulate to a degree, which would make it comparatively easy for them to meet the increased prices of an occasional and very rare year of general failure of the rain; (3) that the last consideration renders it quite a matter for calculation how far the irrigation of even one-third of the whole cultivated area may be necessary; and (4) that in case such a contingency as general and simultaneous famine throughout India, is to be taken into account, some importation from other provinces may certainly be reckoned upon which would still further diminish the necessity for local irrigation.

The inquiry, it would seem, cannot be carried beyond this point without entering upon questions connected with the food supply and capabilities of India as a whole which is beyond my province. I shall therefore pursue it no further, but, assuming that it may be necessary to provide for 3,000,000 acres of canal irrigation in Bengal, I proceed to show how this may be done and at what probable cost.

19. There are three schemes now in hand, the estimated cost and outlay (to end of 1877–78) upon which are as follows :—

| | Estimated lakhs. | Expended lakhs. |
|---|---|---|
| Orissa - | 192·95 | 177·50 |
| Midnapore - | 74·52 | 70·51 |
| Sone - - | 271·00 | 191·00 |
| | 538·47 | 439,01 |

The areas which will be irrigable from these canals, that is to say, those for which there will be an ample supply in the very driest years, are—

| | Acres. |
|---|---|
| Orissa - - - | 1,83,000 |
| Midnapore - - | 53,000 |
| Sone - - - | 1,100,000 |
| Total - - | 1,333,000 |

The expenditure as above shown, is simply the actual outlay under all heads. It does not include interest, nor any book charges, such as provision for pensions and leave allowances. The charge for interest, together with the loss on the working of the canals, *i.e.*, the difference between working expenses and receipts, is now borne by Bengal, and is met from the proceeds of a special tax, the Public Works Cess. It amounted in 1877–78 to 22 lakhs. As this arrangement will no doubt continue, it will not be necessary, in calculating the cost of irrigation in the future, to take into account the accumulated interest and unpaid working expenses of past years. Although these two charges amount to a very large sum, they have been defrayed out of the general revenue and form no part of the amounts for which the local Government is now responsible.

This will greatly simplify calculation, as it renders it possible to show, on the assumption of a certain rate of increase in the spread of irrigation, the precise charges which any given extension of irrigation works will entail upon the province from year to year.

20. Of the three schemes above-mentioned, the Midnapore scheme admits of no extension. Distributaries have in fact already been constructed for a very much larger area than the water actually available in years of extreme drought will suffice for, the works having been commenced by the Irrigation Company in ignorance of the real discharge of the river from whence the supply is taken in years of scant rainfall.

The area irrigable by the Sone canals, as above shown, viz., 1,100,000 acres, might be increased by 130,000 acres by a short extension of the main western canal. I do not take this into account in my estimate of returns, as this is based upon the, perhaps rather extreme assumption that every acre irrigable will be irrigated from year to year. I reckon on the regular irrigation of 1,100,000 acres only, out of 1,230,000 acres commanded, in ordinary years, but the larger figure should be taken as the area irrigated in an extreme year, because water would be available for it and would in such a year certainly be used. There is no estimate of the cost of this extension, but it would probably not exceed Rs. 18 per acre, that of the whole scheme being Rs. 25. At this rate the cost of the extension would be Rs. 23,40,000.

The cost of the Sone irrigation scheme would then be, for a total irrigable area of 1,230,000 acres, Rs. 294·4 lakhs, of which 191·00 lakhs had been expended to close of last year.

The Orissa scheme is capable of manifold extension. The canals actually constructed command an area between two and three times that now irrigable, no distributaries having been provided for some of them in the sanctioned estimates. Another 464,000 acres might be irrigated in the Cuttack district by one or two short extensions of existing canals and the construction of distributaries; 150,000 acres more in Balasore by the extension of the present high-level canal beyond Bhuddruck where it now terminates; and 250,000 acres more by the construction of canals in the Pooree district. The head works for all these canals have long been finished, and there is an ample supply of water in the rivers in all seasons. Thus the present irrigable area of 183,000 acres might be increased to 736,000 acres, at an outlay which the Superintending Engineer estimates at Rs. 160·84 lakhs. The total cost of the works would then be—

| | Lakhs. |
|---|---|
| Scheme as now sanctioned - | 192·95 |
| Extensions - - - | 160·84 |
| Total - | 353·79 |

of which Rs. 177·50 lakhs had been expended to end of last year.

Mr. Walker, the Superintending Engineer, is an officer of great experience and thorough knowledge of Orissa, and his estimates may be received with confidence.

21. Thus the three principal irrigation schemes in their fully-developed form would show as follows :—

| | Cost. | Irrigable area. |
|---|---|---|
| | Lakhs. | Acres. |
| Orissa - - - | 353·79 | 736,000 |
| Midnapore - - | 74·52 | 50,000 |
| Sone - - - | 294·4 | 1,230,000 |
| Total - | 722·71 | 2,016,000 |
| Outlay to end of 1877–78 - | 538·47 | —4 |

Area now irrigable, though not yet fully supplied with village channels—

| | Acres. |
|---|---|
| Orissa - - | 120,000 |
| Midnapore - - | 50,000 |
| Sone - - | 800,000 |
| Total - | 970,000 |

To the area above shown there should be added that which will be irrigated by the two small schemes already mentioned in Sarun and Hooghly which, as it does not

amount to anything large, I take approximately at 170,000 acres. The cost of the Sarun works, which will merely throw a certain quantity of water into some old existing channels, without providing for its distribution, will be six lakhs only. That of the Hooghly scheme will be about five lakhs. Something more may have to be added to bring the irrigable area up to 170,000 acres, but it is not possible now to estimate how much, as it will depend a good deal upon what the people are willing to do for themselves without the help of Government.

Adding the area just mentioned, the gross area that will be irrigable, if existing schemes are carried out to the extent indicated in the preceding paragraph, will be nearly 2,200,000 acres.

22. Now, as to new schemes. The canals already constructed being situated on the south side of the Ganges and in Orissa, leave entirely untouched all the great tract of country lying along the Nepaul frontier in North Behar which, more than any other, requires irrigation. This tract was the scene of most of the distress of 1873-74, and had often suffered before. It possesses at least two snow-fed rivers, the Gunduk and Kosi, whose minimum discharge is not less than 8,000 cubic feet per second each. It is also intersected by the Bagmutty, the discharge of which is estimated at 2,000 cubic feet per second in the driest years all through the khureef season, and the Kumla, a much smaller river, but which might perhaps be depended upon for the irrigation of about 50,000 acres.

Three schemes have been drawn out in considerable detail for irrigation from the Gunduk on both banks, one for 870,000 acres in Tirhoot from a head at Doomurrea, 60 miles above the mouth, another for 940,000 acres chiefly in Chumparun from a head at Butsura near the hills, and a third for 738,000 acres in Sarun and Goruckpore.

The estimates for the first two were prepared some years ago, and are evidently insufficient. That for Sarun must, I think, be altogether excessive; due probably to a faulty projection generally.

Other schemes have been investigated for irrigation from the Bagmutty, Kumla, and Kosi.

The reports upon all the above schemes are appended to this note.

Speaking generally, I should say that, as the Sone Works which are now so far advanced that we are absolutely certain of what the total outlay will be, will have cost when completed Rs. 25 per acre, we could certainly irrigate another 1,100,000 acres from the rivers in North Behar at a cost not exceeding Rs. 20. There are some old spill and flood channels there which may be utilized with a very great saving as compared with the Sone works, and there are other ways in which cost may be reduced. It must be borne in mind that in the above rates I do not include the charges for interest during and after construction, nor for pensions, because the former would be paid until covered by the receipts out of the Public Works Cess fund, as in the case of the existing canals, and the latter will no doubt be debited to the same fund as they fall due. There is a vast extent of country over which this 1,100,000 acres might be spread. On the west side of the Gunduk there are 2,800 square miles in Sarun and a small part of Goruckpore. On the east side, between the Gunduk and the Kosi, and between the Nepaul frontier and a line drawn east and west through Durbungah which includes the tract most liable to loss of crops from drought, and excludes all the lower portions of Tirhoot, Monghyr, and North Bhagulpore where the rains are more regular and the country is often inundated by the hill streams and Ganges, there are 6,150 square miles. In the latter tract alone, if Mr. Worsley the Collector of Tirhoot's estimate for the Seetamari division may be taken for the whole area, *viz.*, that there are 300 acres of winter rice-crop to the square mile, there must be 1,845,000 acres of this crop alone in need of protection. I think that the 1,100,000 acres might be distributed as follows, though careful local inquiry as to the character of the crops in each tract would be necessary before a final determination could be arrived at—

| | | Acres. |
|---|---|---|
| From the Gunduk | West bank | 200,000 |
| | East „ | 600,000 |
| Bagmutty | | 100,000 |
| Kosi | | 200,000 |
| Total | | 1,100,000 |

23. Supposing these works carried out, and the existing schemes completed, we should have the following irrigable areas in Bengal and Behar :—

| | Acres. |
|---|---|
| *Canals*— | |
| Orissa | 736,000 |
| Midnapore | 50,000 |
| Sone | 1,230,000 |
| Lower Sarun | 100,000 |
| Hooghly | 70,000 |
| North Behar canals | 1,100,000 |
| Total canals | 3,286,000 |
| Wells | 100,000 |
| Streams and inundations, say | 114,000 |
| Total | 3,500,000 |

of which 2,644,000 acres would be within the tract affected by drought in 1873-74, and 856,000 in Orissa and Southern Bengal. In addition to this there would be the great store-house of Eastern Bengal, where an unfailing rainfall secures 13,000,000 acres of rice-crops every year.

I should not contemplate anything beyond this, having regard simply to what is necessary to protect the country from famine, nor am I at all sure that when the question comes to be considered from a broader point of view than the mere irrigational one, and if effective steps can be taken to secure to the ryot a more certain tenure and a more equitable share of the proceeds of his labour, together with better prices for his produce by the extension of communications, that even the extent of irrigation I have suggested would be necessary. As, however, the only schemes proposed in addition to those in hand are likely to be cheap and more speedily remunerative than any hitherto undertaken, their execution would throw such a small additional charge upon the province until they can pay their expenses, that I think they might in any case be carried out.

### Communications.

24. A sketch like the above of a general scheme of irrigation would not be complete without some reference to communications. There are two important defects in the present system of water communications in Bengal, (1), the want of a link to connect the Orissa waterways with the Hooghly; and (2), a similar link to connect the Hooghly with the Pudda or Lower Ganges.

To leave Orissa dependent for its connexion with Bengal upon the sea route, *i.e.*, upon carriage by one or two steamers of a special class, which, even if they carried as cheaply as a canal, could not be increased to meet the sudden and exceptional demands for carriage on a great scale, which a scarcity in Behar might induce, would, in my opinion, be most unwise. The whole question, however, of the Orissa Coast Canal has already been a good deal discussed, and it is unnecessary to enter further into it here. Suffice it to say that this link appears to me such an absolute necessity that I include it as an integral part of the general scheme. The detailed estimates have not yet been received, but they will probably amount to 32 lakhs.

With regard to the connexion of the Hooghly with the Pudda, the direct routes are of course the Bhagirutty, Jeellingee and Matabhangha. As a rule, only one of these is open during the dry months, and is practicable for boats drawing not more than 3 feet, and sometimes not so much. A good navigable line by which the ordinary Ganges boats could pass at all times with their full load is a great desideratum. All the affluents of the Ganges from the north, as the Gogra, Gunduk, Boor Gunduk, Bagmutty, Lucknudai, Kumla, Dhowree, Doomri, Kosi, Mahanuddee, &c., besides those in Rajshahye and Pubna, are navigable for very many miles above their confluence with the Ganges. On one or two of the smallest of these I have seen boats as high up as the frontier of Nepaul. These, with the great river into which they empty, are undoubtedly the natural lines of carriage, and for grain and such bulky goods, the lines of cheapest carriage for all North Behar and much of Northern Bengal. No branch railway lines, severed by the Ganges from the trunk railway on its southern side, can replace them, and they are of the utmost value to the country they drain. But the want of a good and direct connexion with the Hooghly during the months when the traffic is now forced to take the circuitous Soonderbun route is a most serious evil, and certainly ought, if possible, to be remedied. The difficulties, however, in the way are extreme, arising from the shifting character of the banks of the Ganges, the constant wanderings of its deep channel within limits

several miles apart, and the enormous spill which any line running generally north and south would have to cross. The surveys already made show that between Patna and the Brahmaputra there is only one short reach, that between Damookdeah and Sara (the southern terminus of the Northern Bengal State Railway) where the river never alters its channel. The banks here are clay, or at least a tough soil, which withstands the current. This is the only point apparently where a really permanent head for a canal could be secured except at an enormous and altogether prohibitory cost for either a wier or training works. It was hoped that a canal might have been taken off from the Gorai at its head, that river having been for many years stationary in its course, with a fine deep channel; but even there it is now found extensive changes are taking place. The actual head of the Gorai last year was about four miles north of where it used to be, and soundings showed that considerable changes in the direction of shoaling were taking place in the river itself.

Then, as already said, the spill which any canal from north to south must cross is enormous. The practicability of shutting off this spill by embanking the Pudda on its right bank in Moorshedabad and Nuddea has been investigated sufficiently to show that it is a work which could not be undertaken except in connexion with a more general embanking below, or possibly it might be more correct to say that the effect on the river would be such as to render it doubtful whether it could be permitted at all with safety to the districts lower down. The expense too would be great, and one which the zemindars would utterly object to pay as opinions are divided as to whether the inundations there, are, upon the whole, injurious or the reverse. In short, a canal would have to cross the whole of the spill over which the Eastern Bengal Railway is now carried, and carried with a waterway which only suffices to discharge the floods by the heading up of the water at the openings to an extent which is most injurious to the country and a constant source of complaint. Between Koostea on the Pudda and Chogda on the Bhagirutty (the point where a canal might terminate) there are 5,500 lineal feet of openings. A canal would require more; the Government would insist upon more. The bridging, therefore would amount to a very large sum, and the canal would have to be fed by pumping. If carried, however, along the west side of the railway, as it must be, unless it crossed the latter twice in a most awkward manner, difficulty would, I think, be found in obtaining space for it at certain points between the railway and the Matabangha. On the whole, if such a line were practicable, I fear its expense would be found greater than the traffic would pay for. From June to November it would be deserted, the boatmen betaking themselves to the open rivers, and during the dry months much of the up traffic, which is light, would go *viâ* the Bhagirutty, which must at all risks be kept open, if for nothing else, for the Calcutta water-supply. Of course the alternative routes might be taxed, and so the traffic forced into the canal, but that would only be to make matters worse than they are now.

The canalization of the Matabangha by means of moveable dams, combined with a short canal connecting the river a few miles below its head with the Ganges, somewhere in the reach below Sara, might possibly be practicable, and the cheapest way of making the connexion. The canal and river too during the dry months would have to be fed by pumping, but the lift would be comparatively small. The plan may be worth investigating. I cannot offer even a guess as to what the cost might be.

25. If a line cannot be got somewhere in the direction above indicated, the only alternative seems to be the Sahibgunge canal, about which it is perhaps necessary I should make some remarks. The project at one time looked very promising. The canal was to irrigate as well as to be used for navigation, and the estimates of returns were attractive. This, however, was in 1870-71, and the project looks very differently now in the light of the experience gained since then. Who now would talk of irrigating Moorshedabad and Nuddea? It would not pay for the mere cost of distribution. The canal would certainly have to depend for returns upon the navigation tolls. Then, as regards navigation, the canal head would be far too high up river to catch the great bulk of the traffic to Calcutta. This mostly comes from Northern Bengal, the Lower Brahmaputra and Eastern Bengal districts. The rivers by which it moves are all far below Sahibgunge; the head of the Bhagirutty, the highest of them, 70 miles below that point. During the monsoon months the whole of the traffic would go as now by the rivers; even that from Behar and the Upper Ganges would pass the canal and go down the Bhagirutty; this would be the *cheapest* route, even if both were taxed equally. During the dry months all the Eastern Bengal traffic, which is three-fourths of the whole, would go as now by the Goral and other channels *viâ* Koolna, and any that might be tempted to try a more westerly route would prefer the shallow navigation of the Bhagirutty to going 70 miles higher and paying more for the canal route.

The canal would thus take only a part of the up-traffic between Calcutta and Behar during the rains, and perhaps the greater part of the down and up-traffic during the dry months. But this is a small fraction of the total traffic to Calcutta. The traffic now passing Sahibgunge appears to be about 100 lakhs of maunds a year, viz.:—

| | | Mds. |
|---|---|---|
| Down stream | - | 54,00,000 |
| Up ,, | - | 46,00,000 |
| Total | - | 1,00,00,000=3,60,000 |

Half the down-stream traffic is oil-seeds, consigned almost wholly to Calcutta. The remainder consists of sugar, wheat and other grains, saltpetre, tobacco, and miscellaneous articles, a portion of which goes down the Pudda to the Eastern districts. About half would probably take the canal route, if the toll were light, in preference to waiting for the opening of the rivers in the rains or using the Bhagirutty in its shallow state during the dry months.

Half the up traffic is rice, and does not come from Calcutta or the districts along the Nuddea rivers at all, but from Maldah, Dinagepore, Rajshahye, Dacca, &c., on the Pudda. This would not go by the canal. About ten lakhs of maunds are salt from Calcutta. As much of this as is despatched in the dry months would probably take the canal. On the whole we may perhaps assume that half the present traffic, or 200,000 tons, would go by the canal. Two pies per ton per mile is probably the highest toll that the river and railway competition would admit of, or for the whole 168 miles of canal, say Rs. 2 per ton. The revenue would thus be Rs. 4,00,000. The working expenses would be quite Rs. 2,00,000, leaving 2,00,000 profit = 4½ per cent. on 44 lakhs. The canal would cost five times this sum. The estimate as submitted to Government amounts to 235 lakhs, but this includes only 37·72 lakhs (for works) for the weir, about half what would certainly be necessary. On the other hand, the canal might be made of much smaller dimensions both in section and locks, which would effect a large saving. Still the total cost would probably not be much under the estimated amount as above stated.* Viewed therefore simply with reference to the traffic of Bengal, Behar, and so much of the North-Western Provinces as now use the river, the canal would not be a paying work, but, on the contrary, would add about 50 per cent. to the debt which Bengal now has to bear for its irrigation works and canals.

It is of course another question what the result would be if the canal formed one link in a vast chain of water communication extending from the Punjab to Calcutta. That is a question which I cannot now enter into, and which cannot be discussed with any profit without as full a knowledge of the actual condition of the Upper Provinces, their waterways, &c., as I possess of Bengal alone. Speculation upon such questions based on mere general principles and assumptions is fruitless. It would seem, however, that if communication with Upper India could raise the traffic on this line of canal to 600,000 or 700,000 tons per annum, it would pay its expenses with a two-pies toll.

26. There are one or two other questions which it seems necessary that I should notice as briefly as possible while on the subject of communications.

It has been proposed to extend the main western canal of the Sone series 80 miles to Chunar, so as to afford an alternative and a better route for boats between the Ganges above that point and Patna, below which there is always deep water. The bad part of the river is said to be between Chunar and the Gunduk, where the stream has not been swollen by the contributions of that river and the Gogra. However this may be, I cannot recommend the scheme. If carried out, the canal route would be from Chunar to Dehree, then across the Sone to the eastern main canal and down the Patna canal to Dinapore, and so into the Ganges. The distance by canal would be nearly the same as by river, there being about 10 or 15 miles in 200 perhaps in favour of the canal. As nearly as I can recollect, boats going down river would, if they took the canal, have to ascend about 80 feet by 8 locks to the Sone, and then descend 130 feet by 13 locks

* This is exclusive of distributaries and all irrigation works.

to the Ganges. During the rains of course no down-stream traffic would take this route, and it is doubtful whether, tolls considered, it would pay boats to take it in the dry months. Some might prefer it for the up traffic. But there are two radical defects in the line itself. The Sone-crossing will always be a formidable obstacle to traffic. The river bed is two-and-a-half miles wide, of shifting sand, filled up generally to the level of the crown of the weir, but with channels leading to the sluices in the centre and at both extremities of the weir. In the rainy season, I must frankly confess, I fear the crossing will seldom be practicable for laden boats. It can only be made, even with a draught of only three feet of water by keeping so dangerously near the weir that boats seldom could venture the risk. In the dry months, when the weir sluices are closed and the pool above is still water, I hope, by placing two-feet shutters on the weir, a practicable passage for boats drawing four feet may be made. But the question is whether boats drawing three feet to four feet would not prefer to work their way down the Ganges. The next and still more serious objection to this route is the danger of the closing of the Dinapore outlet by sandbanks and "churs." This has already taken place in the case of the Arrah canal. When that canal was designed, the deep channel of the Ganges was on the south side. Now it has wandered away to the north bank, and the unfortunate canal officer, standing at the mouth of the canal, looks across three miles of the white sandy bed of the Ganges to the nearest point where a loaded boat can float. This is the state of things in the dry weather, say for eight months of the year. And there is absolutely no remedy; there is nothing for it but to wait until the river wanders back to the right bank. That exit to the Sone canal is therefore closed indefinitely. It was always hoped that the outfall of the Patna canal would be free from this disadvantage. For very many years the deep channel has lain along the Dinapore bank. Unfortunately signs are now not wanting that the fickle river has begun to waver in its course, and is disposed to turn off towards the opposite side. Shoals are forming, and it is quite within the bounds of possibility that the Patna canal may be in the same predicament as the Arrah same years hence, though it is to be hoped both may not be closed at the same time. It is evident that, until we know absolutely how far the Patna canal can be relied upon for communication with the Ganges, it would be premature to carry out the extension of the main western canal, except for the purposes of local traffic, and for them I do not think it would pay.

27. The extension of the western main canal, however, was really intended to be one link in a line of through canal communication between the North-Western Provinces and Calcutta, and upon this question I cannot avoid recording an opinion. The canal was to run from Chunar (however it might be extended upwards from that point) eastward to the Sone; then, after crossing that river, along the edge of the hills to Monghyr, and thence, beside the railway, to Calcutta, the Sahibgunge canal above noticed being a link in the line, or possibly it may have been intended that the canal should terminate many miles above Sahipgunge in the great pool formed by the weir at that point. The question here is what use such a canal would be to Bengal.

In the first place, it is evident that it would follow the whole way the worst possible line for traffic. Below Monghyr the country is hilly and poor close down to the Ganges, and what with the river and the railway competition for the short distance between that point and Calcutta, the mere difference in cheapness of canal carriage would attract but an insignificant traffic. Above Monghyr, between that place and Chunar, lies the really productive country from whence any traffic on the south side of the Ganges must come.

Now, starting from Chunar, the line would skirt closely the base of a barren range of hills the whole way to the Sone. Between the Sone and Monghyr its course would frequently lie along and not far from similar ranges. Thus its traffic must come mostly from one side, from the country between it and the railway, and it would labor under this serious disadvantage that all the great centres of trade of this tract are on the railway, 60 to 80 miles distant from the canal; and as produce at these points will have always the choice either of the railway or the cheap river carriage, it is improbable that much of it would prefer the canal. The Chota Nagpore traffic is hardly worth taking into account, and will in any case most probably go to the East Indian Railway by the new Gya line

With regard to North Behar, much the more important tract of the two, the only point where its traffic could enter the canal would be at Dinapore, and I have already mentioned the doubt that exists as to the permanency of that entrance. From Dinapore it would have to go 80 miles up to the canal, and then would be 465 miles* from Calcutta. By railway from Patna the distance is only 330 miles. The railway charge for oil seeds and edible grains from Patna to Calcutta is Rs. 35 per 100 maunds† or Rs. 9·52 per ton = 5·5 pies per ton per ton per miles. The same charge, Rs. 9·52, distributed over the canal length of 545 miles, would be at the rate of 3·35 pies per ton per mile, a rate at which boats could not carry even with a toll of only 1 pie per ton per mile. The canal distance might be shortened by 100 miles by a more direct line from Dinapore to the main canal, and the railway charge distributed over this reduced length would be at the rate of 4·1 pie per ton per mile, still a rate that would only just pay with a toll of 1 pie. (I may observe that the canal would be entirely dependent on its tolls for revenue, as there would be no water for irrigation.) Now, if the choice lay between railway and canal, at the same charge by each, there is no doubt which route would be preferred. In fact, looking at the actual conditions of the export trade in the present day, the canal must carry considerably cheaper to compensate for the loss of time *en route* as compared with the rail. Moreover, if we are to compare railway with canal rates, we must assume such tolls as will pay the interest on the cost of the canal, and a toll of 1 pie would not do this, as it would require a through traffic of 1,000,000 tons a year, which, with the rail and river competition, there is no prospect of. There is no point below Dinapore in the absence of a weir and head at Sahibgunge where boats could enter the canal from the Ganges. Hence it may be regarded as certain that a canal would receive none of the great North Behar traffic. Would it receive any from Ghazeepore and Oudh?

Buxar is the point where such traffic would enter, and I think we may be certain that this entrance will be permanent. The distances would be, Buxar to Calcutta—

| | Miles. |
|---|---|
| By canal - | - 529 |
| By rail - | - 411 |

The railway charge is Rs. 44 per 100 maunds, or Rs. 11·98 ger ton. On 529 miles this would be at the rate of 4·3 pies per ton per mile, which, with a one-pie toll, would pay the cost of carriage. Thus there would be nothing to choose between the two routes in point of carrier's charge, while the gain in time, in favour of the railway, would be great. I conclude that a canal would not attract traffic from Ghazeepore and Oudh.

28. It would seem then that Behar and part at least of the North-Western Provinces must depend upon the rail and river for their communication with the port. Lowering the charges by rail for the lower class of goods and making a cheap connection, by canal if practicable, if not by railway, between the Pudda and the Hooghly, appear to be the two directions in which improvement is possible, and a little consideration of the enormous increase of exportable produce which would result from any such extension of irrigation as has been suggested above, will show of what vital importance these two points are. But the question of communication has already occupied so large a part of this note, that I cannot here enter at length upon a discussion of the measures which seem called for to meet the requirements of the case. The question is a very large one, and in importance superior to that of irrigation. I will only say that I think that the Government should lay it down as a settled point, that the cost of transport for cheap exportable produce from Patna to Calcutta shall not exceed 3 pies per ton per mile instead of 5·5 pies as at present, and, if proper arrangements are made, I believe this to be perfectly practicable. This is the rate in Belgium for all lowest class goods for distances not less than 150 miles. It is the summer rate in the great New York lines of communication with the West, and one, at which they divide the traffic with the canal, and in fact have carried off a very large portion of the canal traffic. It is the maximum rate which the Inland Transportation Commission reckon it would be necessary to charge for long distances on a line constructed specially for goods traffic and worked at slow speed. It might be cheaper to lay another line of rails all along the East Indian Railway than to make a canal, and if the traffic requiring high speed, which must be

* The canal would follow the loop line which is much longer than the chord.

† 100 railway maunds = 3,673 tons

comparatively small, could be done on one line, and the other two appropriated to goods traffic at low speed, it is probable that the railway under such conditions, and with its shorter distance, could carry at a lower rate than any canal. I merely throw out this as a suggestion for the consideration of the Commission. It may, I think, be looked upon as certain that, as far up at least as Allahabad, a canal would not cost less than 10,000*l.* a mile, and below the Sone there would be very serious difficulties of construction to be overcome. This amount includes the cost of an aqueduct across the Sone which would be absolutely necessary.

29. I proceed to show the probable financial effect of such on outlay on irrigation works as I have suggested, viz., for—

| | Lakhs. Rs. | |
|---|---|---|
| (1.) Sone canals - | 270·68 | including past outlay. |
| (2.) Midnapore canals - | 74·52 | Do. do. |
| (3.) Orissa canals - | 353·51 | Do. do. |
| (4.) Canals to irrigate 1,100,000 acres in North Behar | 220·0 | |
| (5.) The Orissa coast canal - - | 64·73 | including past outlay on Hidgellee canal. |
| Total - | 983·44 | |
| or £ - | 9,834,400 | |

I include the last project, because so obviously essential, that it may be regarded as a part of the system of canals connected with irrigation.

In calculating results, I start from the *status quo*, viz., the actual expenditure up to the present time, and the charge which now falls upon the local government for the unpaid interest upon that amount and working expenses. Then, assuming a certain rate of expenditure per annum in each district, based upon the actual rates which have been found practicable without any serious rise of rates of labour in the past, and a certain rate of expansion of the irrigable and irrigated area, I show for each scheme and for each year what the charge for interest and unpaid working expenses would be; and lastly, I collect all the schemes in an abstract under similar heads and show the total charge which would fall upon the Bengal Government from year to year, supposing the whole scheme carried out in about 12 years (*See Appendix A*).

The doubtful element in such a calculation is of course the rate at which the irrigated area would increase; but, if *low water rates* be assumed, such as actual experience has shown the people are willing to pay for water taken on a great scale, much of this uncertainty disappears.

Now, in every case, I have assumed an all round rate of Re. 1-8 per acre only up to about 1888, *i.e.*, for 10 years to come. Experience in Orissa and Midnapore has shown conclusively that in these parts of Bengal the people are willing to take water at this rate on long leases for the whole irrigable area. There is no longer any doubt upon this point. The whole area really irrigable has now been leased for five years on these terms.

On the Sone the rates hitherto charged have been Rs. 2-8 for both khureef and rubbee,* but three-year leases have recently been offered at Re. 1-8 for the former and Rs. 2-4 for the latter. The Collector and all the officers and planters best acquainted with the district are of opinion that, if an all-round rate of Rs. 2 be offered, the whole area will be leased on long terms. I have assumed only Re. 1-8 in my calculations. The same for North Behar. After about 1888 I assume a rate of Rs. 2.

The working expenses, less the receipts from navigation and miscellaneous sources, are taken at 12 annas per acre, a rate which it would take too much space now to justify, but which will not, I think, be objected to as too low, and which experience here and in the North-Western Provinces tend to confirm.

Interest is calculated at 4½ per cent.

The result arrived at is, it will be seen, that, with an outlay up to the present time of nearly 5,000,000*l.*, amounting up to nearly 10,000,000*l.* in 1892, the deficit on account of interest and working expenses would gradually rise from 19 lakhs, its present amount, to 24 lakhs in 1885, then rapid decrease, then finally disappear in 1895 97.

* With the exception of one season when the rate for khureef was lowered to Re. 1.

The total deficit to be thus made good by the Province out of special taxation in 20 years would be about 3,000,000*l.*, or at the rate of 150,000*l.* a year. The mean irrigated area, however, would be 1,700,000 acres, and, if the increased yield due to irrigation be taken at only Rs. 5 per acre per annum, the annual addition to the wealth of the country would be nearly 1,000,000*l.*, or 20,000,000*l.* in 20 years, to say nothing of the saving of the sums now lost in the years of scarcity, and the diminished indebtedness and generally increased prosperity of the people of the irrigated tracts.

30. An owner's rate, if it could be imposed, would largely reduce the deficit. There appear to be in the minds of those best acquainted with the question serious difficulties about such a rate in the permanently-settled Provinces, though I have never been able to see them. It is certain that when the existing land settlement was made the Government, in pledging itself never to raise its demand, did not contemplate the policy of expending millions of money upon works which would largely add to the value of the land, and it is hard to see upon what principle such a policy can be justified at all if the class which most surely benefits by it is to bear no part of the burden. It is true that the injustice of making other provinces pay for the public works of Bengal now no longer exists, but it is to be remembered that the Public Works Cess by which the annual deficit is met is paid wholly by the ryots though levied on the zemindars. So far the latter class seem to go scot-free, and this anomaly is the more striking in the case of Behar, where the greater part of the expenditure would take place if, as I understand, the land revenue there is not one-fifth of the actual rental. An attempt is now being made in Shahabad to make the zemindar pay half the water-rate where the tenure is "bhowli" (rent paid in kind, usually half the produce), and so far with some success, but this class of tenures is gradually being commuted into money rents, and irrigation will hasten the process. The zemindars then will bear no part of the charge for the water, while retaining full legal power to raise their rents on the strength of irrigation, a power which they have not failed to exercise in Orissa, and that to an extent of which we as yet know very little. There, however, no interference appears to be possible until the expiry of the present 30 years' settlement in 1896, when Government will be in a position to take a proper share of the rent.

31. Here I must leave the question of the extension of irrigation in Bengal, though conscious that, in spite of the extreme length of this note, I have only touched superficially upon the subject. The cognate and far more important question of communications is one which could not be satisfactorily and fully discussed by a mere engineer. The Commission, in dealing with it, will no doubt take care to make themselves acquainted with the special character of the export trade of the country in the present day, a clear understanding of which is necessary in order to form right conclusions as to what the requirements of inland transport in the valley of the Ganges really are. I think, when they come to deal with the subject, they will be struck with the utter absence of any statistics bearing on the actual effect of railway communication upon the districts which possess it, the local value of produce, the value in the markets of Europe, and the rates at which it ought to be possible to put down produce at Calcutta if Upper India is to take its proper place in the markets of the world. There is, I believe, a Department of Agriculture and Commerce. Possibly its records may furnish some information upon the subject. At present we have to note that the lowest charge for the carriage of wheat and seeds from Patna to the port, a distance of 330 miles, is from half to 75 per cent. of the cost of carriage, 6,000 to 12,000 miles to Liverpool, and that a reduction of one-half in the rate would give an increased value to all produce of this description which would be equivalent to the reduction by one-half of the land-rents of Behar. Might it not be worth the while of Government to become responsible for any loss which such a reduction might cause, charging it, like the deficit on public works, to the special cess, and confining it entirely to exportable produce of low value? There is a field for inquiry here, the importance of which utterly dwarfs that of most of the subjects which furnish the chapters of our annual administration reports, but which, unhappily, no one seems to have any time or inclination to investigate.

Calcutta, the 30th December 1878.

# APPENDIX A.

## Orissa Canal.

| Year. | Outlay to end of Year mentioned in Column 1. | Interest for the Year at 4½ per Cent. | Working Expenses, less Receipt from Navigation and Miscellaneous. | Total Charge for Interest and Working Expenses, Columns 3 and 4. | Receipts from Water Rates. | Difference between Total Charge and Receipts from Water-rates to be borne by Bengal Government. | Irrigable Area. | Irrigated Area. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Acres. | Acres. | |
| 1876–77 - | 1,72,84,000 | 7,63,000 | 1,80,500 | 9,43,500 | 40,490 | 9,03,100 | 1,00,000 | 1,00,000 | Water rate. |
| 1877–78 - | 1,77,51,000 | 7,90,500 | 1,72,800 | 9,63,300 | 1,17,000 | 8,45,300 | 1,00,000 | 1,00,000 | |
| 1878–79 - | 1,87,51,000 | 8,21,300 | 1,50,000 | 9,71,300 | 1,50,000 | 8,21,300 | 1,00,000 | 1,00,000 | |
| 1879–80 - | 1,97,51,000 | 8,66,300 | 1,60,000 | 10,26,300 | 2,10,000 | 8,16,300 | 1,40,000 | 1,40,000 | |
| 1880–81 - | 2,10,51,000 | 9,18,000 | 1,70,000 | 10,88,000 | 2,40,000 | 8,48,000 | 1,80,000 | 1,60,000 | |
| 1881–82 - | 2,25,51,000 | 9,81,000 | 1,80,000 | 11,61,000 | 2,85 000 | 8,76,000 | 2,30,000 | 1,90,000 | |
| 1882–83 - | 2,40,51,000 | 10,48,500 | 1,92,000 | 12,40,500 | 3.30,000 | 9,10,500 | 2,80,000 | 2,20,000 | At Rs. 1–8. |
| 1883–84 - | 2,55,51,000 | 11,16,000 | 2,33,000 | 13,49,000 | 3,90,060 | 9,59,000 | 3,40,000 | 2.60,000 | |
| 1884–85 - | 2,71,51,000 | 11,85,700 | 2,75,000 | 14,60,700 | 4,65,000 | 9,95,700 | 4,10,000 | 3,10,000 | |
| 1885–86 - | 2,89,51,000 | 12,62,200 | 3,30,000 | 15,92,200 | 5,40,000 | 10,52,200 | 4,80,000 | 3,60,000 | |
| 1886–87 - | 3.07,51,000 | 13,43,200 | 3,50,000 | 16,93,200 | 6,15,000 | 10,78,200 | 5,60,000 | 4,10,000 | |
| 1887–88 - | 3,25,51,000 | 14,24,200 | 4,00,000 | 18,24,200 | 7,05.000 | 11,19,200 | 6,46,000 | 4,70,000 | |
| 1888–89 - | 3,40,51,000 | 14,98,400 | 4,35,000 | 19.33,400 | 10,60,000 | 8,73,400 | 6,96,000 | 5,30,000 | |
| 1889–90 - | 3,53,51,000 | 15,61,400 | 4,60,000 | 20,21,400 | 11,80,000 | 8,41,400 | 7,36,000 | 5,90,000 | At Rs. 2. |
| 1890–91 - | 3,53,51,000 | 15,90,600 | 4,60,000 | 20,50.600 | 13,40,000 | 7,10,600 | 7,36,000 | 6,70,000 | |
| 1891–92 - | 3,53,51,000 | 15,90,600 | 4,60,000 | 20,50,600 | 14,72,000 | 5,78,600 | 7,36,000 | 7 36,000 | |

## Midnapore Canal.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1876–77 - | 68,35,0 0 | 2,97,900 | 95,700 | 3,93,600 | 61,500 | 3,32,100 | 80,000 | 54,000 | |
| 1877–78 - | 70,52,000 | 3,13,200 | 87,200 | 4,00,400 | 53,500 | 3,46,900 | 80,000 | 54,000 | |
| 1878–79 - | 72,52,000 | 3,21,800 | 5,000 | 3,26,800 | 81,000 | 2,45,800 | 80,000 | 54,000 | |
| 1879–80 - | 74,52,000 | 3,30,800 | 5,000 | 3,35,800 | 81,000 | 2,54,800 | 80,000 | 54,000 | |
| 1880–81 - | 74,52,000 | 3,35,300 | 5,000 | 3,40,300 | 90,000 | 2,50,300 | 80,000 | 60,000 | |
| 1881–82 - | 74,52,000 | 3,35,300 | —5,000 | 3,30,300 | 1,05,000 | 2,25,300 | 80,000 | 70,000 | At Rs. 1–8. |
| 1882–83 - | 74,52,000 | 3,35,300 | —25,000 | 3,10,300 | 1,20,000 | 1,90,300 | 80,000 | 80,000 | |
| 1883–84 - | 74,52,000 | 3.35,300 | —25,000 | 3,10,300 | 1,20,000 | 1,90,300 | 80,000 | 80,000 | |
| 1884–85 - | 74,52,000 | 3,35,300 | —25,000 | 3,10,300 | 1,20,000 | 1,90,300 | 80,000 | 80,000 | |
| 1885–86 - | 74,52,000 | 3,35,300 | —25,000 | 3,10,300 | 1,20,000 | 1,90,300 | 80,000 | 80,000 | |
| 1886–87 - | 74,52,0 0 | 3,35,3 0 | —25,0 0 | 3,10,300 | 1,20,000 | 1,90,300 | 80,000 | 80,000 | |
| 1887–88 - | 74,52,000 | 3,35,300 | —25,000 | 3,10,300 | 1,60,000 | 1,50,300 | 80,000 | 80,000 | At Rs. 2. |
| 1888–89 - | 74,52,000 | 3,35,300 | —25,000 | 3,10,300 | 1,60,000 | 1,50,300 | 80,000 | 80,000 | |
| 1889–90 - | 74,52,000 | 3,35,309 | —25,000 | 3,10,300 | 1,60,000 | 1,50,300 | 80,000 | 80,000 | |

## Sone Canal.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1876–77 - | 1,73,77,000 | 7,36,600 | 1,86,200 | 9,22,800 | 59,800 | 8,63,000 | 5,00,000 | 3,00,000 | |
| 1877–78 - | 1,90,68,000 | 8,19,200 | 2,10,700 | 10,29,900 | 59,600 | 9,70,300 | 5,00,000 | 3,00,000 | |
| 1878–79 - | 2,00,68,000 | 8 80,500 | 3,00,000 | 11,80,500 | 4,50,000 | 7,30,500 | 5,00,000 | 3,00,000 | |
| 1879–80 - | 2,10,68,000 | 9.25,500 | 3,70,000 | 12,95,500 | 5,55,000 | 7,40,500 | 6,00,000 | 3,70,000 | |
| 1880 81 - | 2.20,68,000 | 9,70,500 | 4,40,000 | 14.10,500 | 6,60,000 | 7,50,500 | 7,00,000 | 4,40,000 | |
| 1881–82 - | 2,30,68,000 | 10,15,500 | 5.10.000 | 15,25,500 | 7,80,000 | 7,45,500 | 8,00,000 | 5,20,000 | At Rs. 1–8. |
| 1882–83 - | 2,40,68,000 | 10,60,500 | 5,80,000 | 16,40,500 | 9,00,000 | 7,40,500 | 9,00,000 | 6,00,000 | |
| 1883 84 - | 2.50.68,000 | 11,05,500 | 6.60.000 | 17,65,500 | 10,35,00 | 7,30,500 | 10,00,000 | 6,90,000 | |
| 1884–85 - | 2.60,68,000 | 11,50,500 | 6,80,000 | 18,30,500 | 11,70,000 | 6.60,500 | 11,00,000 | 7,80,000 | |
| 1885–86 - | 2,70,68,000 | 11,95,500 | 7,00,000 | 18,95,500 | 13.05,000 | 5,90,500 | 11,00,000 | 8,70,000 | |
| 1886–87 - | 2,70,68,000 | 12,18,000 | 7,10,000 | 19,28,000 | 19,20 000 | 8,000 | 11,00,000 | 9,60,000 | At Rs. 2. |
| 1887–88 - | 2,70,68,000 | 12,18,000 | 7,20,000 | 19,38,000 | 20,60,000 | —1,22,000 | 11,00,000 | 10,30,000 | |
| 1888–89 - | 2,70,68,000 | 12,18,000 | 7,20,000 | 19,38,000 | 22,00,000 | —2,62,000 | 11,00,000 | 11,00,000 | |

## North Behar.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1879–80 - | 10,00,000 | 45,000 | — | 45,000 | — | 45,000 | — | — | |
| 1880–81 - | 30,00,000 | 90,000 | — | 90,000 | — | 90,000 | — | — | |
| 1881–82 - | 50,00,000 | 1 80,000 | — | 1,80,000 | — | 1,80,000 | — | — | |
| 1882–83 - | 70,00,000 | 2,70,000 | — | 2,70,000 | — | 2,70,000 | — | — | |
| 1883–84 - | 90,00,000 | 3,60,0 00 | — | 3,60,000 | — | 3,60,000 | — | — | |
| 1884 85 - | 1,10,00,000 | 4,50,000 | 1,00,000 | 5,50,000 | 75,000 | 4,75,000 | 1,00,000 | 50,000 | |
| 1885 86 - | 1,30,00,0 0 | 5.40,000 | 2,00,0 0 | 7,40,000 | 2,25,000 | 5,15,000 | 3,00,000 | 1,50,000 | |
| 1886–87 - | 1,50,00,000 | 6,30,000 | 3,00,0 0 | 9,30,000 | 4,50,000 | 4.80,000 | 5,00,000 | 3,00,000 | At Rs. 1–8. |
| 1887 88 - | 1,70,00,000 | 7,20,0 0 | 3,70,000 | 10,90,000 | 5 55,000 | 5,35,000 | 6,00,000 | 3,70,000 | |
| 1888 89 - | 1,85,00,000 | 7,98,750 | 4,40,000 | 12,38,750 | 6,60,000 | 5,78,750 | 7,00,000 | 4,40,000 | |
| 1889 90 - | 2,00,00,000 | 8,66,250 | 5,10,0 0 | 13,76,250 | 10,40,0 0 | 3,36,250 | 8,00,000 | 5,20,000 | |
| 1890 91 - | 2,10,00 000 | 9,22 500 | 5,80,0 0 | 15,02,500 | 12,00,000 | 3,02,500 | 9,00,000 | 6,00,000 | |
| 1891–92 - | 2.20,00,000 | 9 67 500 | 6,60,000 | 16.27,500 | 13,80,000 | 2,47,500 | 10,00,000 | 6,90,0 0 | |
| 1892–93 - | 2.20,00,000 | 9,90,500 | 6,80,0 0 | 16,70,0 0 | 15,0 0,000 | 1,10,000 | 11,00,000 | 7,80,000 | |
| 1893–94 - | 2,20,00,000 | 9 90,000 | 7,00,000 | 16,90,000 | 17,40,0 0 | —50,000 | 11 00,000 | 8,70,000 | At Rs. 2. |
| 1894–95 - | 2,20,00,000 | 9,90,000 | 7,10,000 | 17,00,000 | 19,20,000 | —2,20,0 0 | 11,00,000 | 9,60,000 | |
| 1895–96 - | 2,20,00,000 | 9,90,000 | 7.20,000 | 17,10,000 | 20,60,000 | —3.50,000 | 11,00,000 | 10,30,000 | |
| 1896–97 - | 2,20,00,000 | 9,90,000 | 7,20,000 | 17,10,000 | 22,00,000 | —4,90,000 | 11,00,000 | 11,00,000 | |

ORISSSA COAST CANAL, INCLUDING THE PRESENT TIDAL CANAL.

| YEAR. | Outlay to end of Year mentioned in Column 1. | Interest for the Year at 4½ per Cent. | Working Expenses. | Total Charge for Interest and Working Expenses, Columns 3 and 4. | Receipts. | Difference between Total Charge and Receipts to be borne by Bengal Government. | REMARKS. |
|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | |
| 1876–77 - - | 17,73,000 | 80,500 | 12,400 | 92,900 | 45,000 | 47,900 | |
| 1877–78 - - | 17,73,000 | 80,300 | 30,600 | 1,10,900 | 62,300 | 48,600 | The receipts are calculated in the same manner as in the reports and Chief Engineer's note submitted to Government of India. |
| 1878–79 - - | 17,73,000 | 80,300 | 14,000 | 94,300 | 40,000 | 54,300 | |
| 1879–80 - - | 25,73,000 | 97,800 | 22,400 | 1,20,200 | 50,000 | 70,200 | |
| 1880–81 - - | 33,73,000 | 1,33,800 | 32,400 | 1,66,200 | 60,000 | 1,06,200 | |
| 1881–82 - - | 41,73,000 | 1,69,800 | 42,400 | 2,12,200 | 80,000 | 1,32,200 | |
| 1882–83 - - | 49,73,000 | 2,05,800 | 92,000 | 2,97,800 | 1,40,000 | 1,57,800 | |
| 1883–84 - - | 57,73,000 | 2,41,800 | 1,02,000 | 3,43,800 | 2,20,000 | 1,23,800 | |
| 1884–85 - - | 64,73,000 | 2,75,500 | 1,22,000 | 3,97,500 | 3,00,000 | 97,500 | |
| 1885–86 - - | 64,73,000 | 3,09,200 | 1,42,000 | 4,51,200 | 3,80,000 | 71,200 | |
| 1887–87 - - | 64,73,000 | 3,09,200 | 1,43,000 | 4,52,200 | 4,60,000 | —7,800 | |

ABSTRACT.

| YEAR. | Outlay to end of Year mentioned in Column 1. | Interest for the Year at 4½ per Cent. | Working Expenses, less Receipt from Navigation and Miscellaneous. | Total Charge for Interest and Working Expenses, Columns 3 and 4. | Receipts from Water Rates. | Difference between Total Charge and Receipts from Water-Rates to be borne by Bengal Government. | Irrigable Area. | Irrigated Area. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | |
| | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | |
| 1876–77 - | 4,32,69,000 | 18,78,000 | 4,74,800 | 23,52,800 | 2,06,700 | 21,46,100 | 6,80,000 | 4,54,000 | |
| 1877–78 - | 4,56,44,000 | 20,03,200 | 5,01,300 | 25,04,500 | 2,93,200 | 22,11,300 | 6,80,000 | 4,54,000 | |
| 1878–79 - | 4,78,44,000 | 21,03,900 | 4,69,000 | 25,72,900 | 7,21,000 | 18,51,900 | 6,80,000 | 4,54,000 | |
| 1879–80 - | 5,18,44,000 | 22,65,400 | 5,57,400 | 28,22,800 | 8,96,000 | 19,26,800 | 8,20,000 | 5,64,000 | |
| 1880–81 - | 5,69,44,000 | 24,47,600 | 6,47,400 | 30,95,000 | 10,50,000 | 20,45,000 | 9,60,000 | 6,60,000 | |
| 1881–82 - | 6,22,44,000 | 26,81,600 | 7,27,400 | 34,09,000 | 12,50,000 | 21,59,000 | 11,10,000 | 7,80,000 | |
| 1882–83 - | 6,75,44,000 | 29,20,100 | 8,39,000 | 37,59,100 | 14,90,000 | 22,69,100 | 12,60,000 | 9,00,000 | |
| 1883–84 - | 7,28,44,000 | 31,58,600 | 9,70,000 | 41,28,600 | 17,65,000 | 23,63,600 | 14,20,000 | 10 30,000 | |
| 1884–85 - | 7,81,44,000 | 33,97,000 | 11,52,000 | 45,49,000 | 21,30,000 | 24,19,000 | 16,90,000 | 12,20,000 | |
| 1885–86 - | 8,29,44,000 | 36,42,200 | 13,47,000 | 49,89,200 | 25,70,000 | 24,19,200 | 19,60,000 | 14,60,000 | |
| 1886–87 - | 8,67,44,000 | 38,35,700 | 14,78,000 | 53,13,700 | 35,65,000 | 17,48,700 | 22,40,000 | 17,50,000 | |
| 1887–88 - | 9,05,44,000 | 40,06,700 | 16,08,000 | 56,14,700 | 39,40,000 | 14,74,700 | 24,26,000 | 19,50,000 | |
| 1888–89 - | 9,35,44,000 | 41,59,650 | 17,13,000 | 58,72,650 | 45,40,000 | 13,32,650 | 25,76,000 | 21,50,000 | |
| 1889–90 - | 9,63,44,000 | 42,90,150 | 18,08,000 | 60,98,150 | 50,40,000 | 10,58,150 | 27,16,000 | 22,00,000 | |
| 1890–91 - | 9,73,44,000 | 43,75,600 | 18,78,000 | 62,53,600 | 53,60,000 | 8,93,600 | 28,16,000 | 24,50,000 | |
| 1891–92 - | 9,83,44,000 | 44,20,600 | 19,58,000 | 63,78,600 | 56,72,000 | 7,06,600 | 29,16,000 | 26,06,000 | |
| 1892–93 - | 9,83,44,000 | 44,43,100 | 19,78,000 | 64,21,100 | 58,52,000 | 5,69,100 | 30,16,000 | 26,96,000 | |
| 1893–94 - | 9,83,44,000 | 44,43,100 | 19,98,000 | 64,41,100 | 60,32,000 | 4,09,100 | 30,16,000 | 27,86,000 | |
| 1894–95 - | 9,83,44,000 | 44,43,100 | 20,08,000 | 64,51,100 | 62,12,000 | 2,39,100 | 30,16,000 | 28,76,000 | |
| 1895–96 - | 9,83,44,000 | 44,43,100 | 20,18,000 | 64,61,100 | 63,52,000 | 1,09,100 | 30,16,000 | 29,46,000 | |
| 1896–97 - | 9,83,44,000 | 44,43,100 | 20,18,000 | 64,61,100 | 64,92,000 | —31,100 | 30,16,000 | 30,16,000 | |

*Note by* COLONEL F. T. HAIG, R. E., *Chief Engineer, Bengal, Irrigation Branch, on the Sarun Irrigation Scheme.*

1. The scheme submitted to the planters and zemindars who met at Chupra in December last consisted of a canal to be led off from the Gunduk near the head of the Roopun Chup Sota, with branch channels connecting it with the Daha, Gunduki, Dhunai, Gungree, and Kutsar nullahs. The agent of the Maharajah of Hutwah having intimated the willingness of the Maharajah to join in the guarantee on condition that water should also be thrown into the Joraie above the Senpore Factory, it was stated on behalf of the Engineers that this part of the project had not been worked out in detail, but that a cut for the purpose had been proposed by the late Superintending Engineer, Mr. Martin, and that it was hoped that this would be found to be practicable at a moderate expense. On the understanding that this should form part of the scheme, the Maharajah's Agent promised a contribution of Rs. 8,000 per annum towards the amount of the guarantee which was taken at Rs. 28,000, viz., 4½ per cent. on Rs. 6,00,000, the assumed cost of the works.

2. After careful investigation it has been found impracticable to lead the Gunduk water into the Joraie as high up as Senpore from the Roopun Chup head, and this part of the scheme must therefore be omitted. An ample supply could be thrown into the Joraie by a cut from the Bassie nullah some miles higher up; but as this would involve some interference with the boat traffic carried on on the Bassie, and the cut itself would lie within the Goruckpore District, it has been found necessary to make a reference to the Government of the North-Western Provinces to ascertain whether the Lieutenant-Governor would object to the project. It will, in any case, be quite distinct from, and unconnected with, that known as the Gunduki Head project, submitted to the meeting at Chupra.

3. The Maharajah of Hutwa has, however, other interests in the land lower down than Senpore, and though he may not now be willing to contribute the full sum of Rs. 8,000 originally offered, it is probable that he will give at least Rs. 1,000 or Rs. 2,000 in consideration of the value of the water to some parts of his estates on the Daha, &c. If the former amount only, the available guarantee will now amount to Rs. 28,000—Rs. 7,000 = Rs. 21,000.

4. The surveys and examination of the Roopun Chup Sota and the heads of the nullahs are now complete, and it is found practicable to carry out the suggestion put forward by Mr. D. Reid, at the meeting, that the Sota should be utilised instead of making an artificial canal alongside of it as originally proposed.

5. The scheme as now submitted in the rough by Mr. Vertannes, consists, (1) in embanking the Sota from end to end, closing both head and mouth, so as completely to exclude the Gunduk floods; (2) making a short cut from the head originally proposed for the canal to lead the water into the Sota; (3) damming the Sota about half-way down so as to raise the water to a suitable level; and (4) making three cuts from it at proper points to conduct the water into the Daha, Gunduki, and Dhunai. These cuts will be furnished with regulating sluices at their heads.

6. The dimensions assigned to the supply cut from the Gunduk to the Sota are less than those originally proposed. It is now intended to have a bottom width of 50 feet instead of 80 feet. The supply which this will afford will still be more than ample for all the requirements of the guarantors, and it is thought best not to exceed this limit in the first instance, as it will be easy to enlarge the channel (which is very short) afterwards if the demand for irrigation and manufacture should render an increased supply desirable.

7. The cost of the scheme, including a charge for establishments of 10 per cent. upon works, will be 5 lakhs. The interest on this at 4½ per cent. would be Rs. 22,500, or slightly in excess of the amount that will probably be available, judging only by the amounts already promised. But as the whole of the planters of Sarun were not represented at the meeting, and some who were not present will probably benefit by the scheme, it is not likely that there will be any difficulty in raising the extra Rs. 1,000 or Rs. 1,500 per annum required to cover the interest on the outlay.

8. The scheme being thus far matured, and it being understood that the want of water is already much felt, the Executive Engineer has received orders at once to commence operations upon the three supply cuts from the Sota into the Daha, Gunduki, and Dhunai, and to push the work forward as rapidly as possible. It will not be practicable to close the head of the Sota before the next flood season, but by deepening the bed a little at the head, at an outlay which Mr. Vertannes thinks will not exceed Rs. 1,500, and throwing a temporary dam across the channel lower down, it will be possible to retain the water in the Sota at such levels as to throw a good stream down the three supply cuts as soon as they are finished. In this way it is hoped that, if a good supply of labour is available, it may be possible to furnish, this season, as much water as will be required for all manufacturing purposes in the three nullahs, and probably a good deal more. After the floods are over the Sota may be closed, the head sluice constructed, and the embankments completed, so that next year the works will be in full operation.

9. It is desirable that the above information should now be communicated to the gentlemen interested in the scheme, and that they shoufd be invited to co-operate as much as possible with the Executive Engineer in procuring labour, cheapening rates, and generally keeping down the cost of the works to the utmost. It is likely that much may be done in this way. The rates on which the estimates are based are those which the Public Works Officers would ordinarily have to pay, and these are probably more than the resident planters and zemindars could get the work done for if they bring their local influence to bear.

10. The Executive Engineer will be directed to expedite the preparation of the detailed estimates for submission to the Government of India. He should also, as soon as ever ground has been broken, submit a fortnightly report to the Collector showing the average number of people employed upon the works, the progress made, and (as soon as he is in a position to judge) the probable date when water may be admitted. This report might, with advantage, be circulated among the members of the Executive Committee, in order that they may be kept fully informed of what is going on.

The 20th April 1878.

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*Memorandum by* MR. LEVINGE, *C.E., Superintending Engineer, Sone Circle, on the Scheme for Irrigation and Navigation from the River Gunduck in the District of Chumparun.*

The site for the head works has, after careful consideration, been fixed at Butsura, about 34 miles (by the river) below the gorge at Tribenee, where the Gunduck emerges from the hills. The main canal follows the river bank for 14½ miles, and thence strikes off in an easterly direction, more or less following the 27th parallel of latitude, until it touches the Nepal frontier near the town of Bulthur, from which point it follows the boundary line along the northern extremity of the district to the River Bagmuthee, where it terminates.

2. The portion of the Chumparun south of this canal is commanded by the proposed works, with the exception of 120 square miles included in the Lower Gunduck scheme.

3. The north-west corner of the district, comprising Pergunnah Ramnugger and part of Mujowlee, it is proposed to irrigate from a reservoir in the Doon Valley, situated in the Soomeysur range, and shown on the accompanying index map No. 1. This part of the project has not, however, as yet been fully elaborated, and some more information is required before the designs and estimates can be forwarded in detail; but as the scheme now sent up is complete in itself, I have thought it better not to delay its submission.

4. The most important question, and one which is entitled to the first consideration, is whether the project is likely to be acceptable to the people of the district. In answer to this, I beg to refer to the memorandum by Mr. Metcalfe, collector of Chumparun, which will be found attached to Mr. Stoney's report, Appendix B., and I would call special attention to paragraphs 1 to 4, and paragraph 28 here quoted.

"PARA. 1.—During my last cold weather tour I was "besieged by enquiries, both from the better as well as "from the poorer class of agriculturists, regarding the "prosecution of a scheme of irrigation, the possibility "of which was hailed by the native population, for "causes which will be assigned hereafter, as the greatest "boon that could be conferred on them and the district "at large.

"2. I am apprehensive that this project should now "fall to the ground, and the sanguine expectations of "the whole of the agricultural population should be "overthrown.

"3. It seems to me, therefore, advisable that I should "bring the anxiety of the native population on this "point prominently to the attention of Government, "and, in doing so, recall the circumstance that this "district suffered very severely in the famine of 1237, "corresponding with the year 1866.

"4. The interest which this preliminary canal survey "has excited arises from the fact that a canal scheme "holds out a vista of life and prosperity for the future; "its abandonment, no prospect but destruction to life "and property."

* * * * * *

"28. The wishes of the ryots, on the other hand, are "entirely in favour of irrigation. Village by village "the question has been asked whether irrigation would "be acceptable to them and if they would undertake "to pay for the benefit. The feelings of each village "have been placed on record, and, with the exception "of a few estates in which the land is not benefited by "irrigation (the water hardening the soil), their consent "has been unanimous."

5. The above statement must, I think, conclusively show that irrigation will be acceptable to the people. There can be no better authority than Mr. Metcalfe, an active and painstaking officer, for several years past collector of the district, who has evidently made himself thoroughly acquainted with the wishes of the people: great weight must be attached to his opinion, which has evidently not been hastily formed, but is founded on facts and figures quoted in his memorandum, the careful perusal of the whole of which I would strongly recommend.

6. The next question for consideration is, will the scheme prove remunerative. The cost of the project, as worked out in detail by Mr. Stoney, is shown to be about 107½ lacs of Rupees, and the area irrigable by the canals 989,500 acres; this gives an acreage cost of Rupees 10-13-6 only, which compares most favourably with the Sone Project; so far then there can be no question as to the advisability of carrying out the works; but will the people take and pay for the water? It has been shown above that the scheme will be acceptable to the people; and that large profits will accrue from the use of the water may be inferred from the statistics of the opium crop.

7. Mr. Stoney, in the comparative statement of yield of opium in Shahabad and Chumparun, which will be found in the 12th paragraph of his report, shows that in the former district the produce is double that in the latter. There can be no doubt, I think, that this excess in quantity is due to the comparatively liberal supply of water given to the opium crop in Shahabad, and this view of the case is fully borne out by the statement made by Mr. Metcalfe in his memorandum, paragraphs 16 and 16A.

8. Turning to the figures quoted in the margin of these paragraphs (16 and 16A. of Mr. Metcalfe's memorandum), and taking it for granted that the people would eagerly take water for the opium crop (*see* paragraph 16A), we should have the water-rate on 127,000 acres as well as the gain to the Government in a nearly double yield, and last, but by no means least, the absolute certainty that no failure of crop could occur.

9. And it is not in the opium crop only, but in all others also, that the yield in Chumparun is less than in Shahabad, attributable, I believe, to the fact that irrigation is even less practised in the former than in Shahabad, incompletely watered as that district unquestionably is.

10. In Chumparun, as in Behar and Shahabad, the principal crop is rice, which, as will be seen from the tabular statement in the 6th paragraph of Mr. Stoney's report, occupies half the cultivated area of the district. To secure this crop, which forms the staple food of the people, from the possibility of failure, and to extend its cultivation as much as possible, should be our great object.

11. First then, is irrigation required for the rice crop? Referring to Mr. Metcalfe's oft-quoted report, paragraph 17A., it appears that in November 1865 scarcity of food existed owing to the early cessation of the rains; again, paragraph 18G., Mr. Gibbon, the manager of the Tikowlee factory, writes: "To the north and east the "crop generally grown is rice, the soil is hard clay, low "and dry, requiring irrigation." In the same paragraph, however, he states that to the south of the Little Gunduck the soil retains its moisture, and it is only in exceptional years that irrigation would be at all necessary.

12. In paragraph 20L., Mr. Cockerell, reporting on the famine of 1864-65, states: "In every district where "rice was the sole or almost the sole cultivation, there "the local distress was most severe, as upon the out-"turn of the crop the condition of the people was "mainly dependent. Again, the high prices ruling in "Behar were the result not merely of exhaustion of "old stock from exportation, but the absence of fresh "supplies owing to two successive years of drought:" the necessity for irrigating the rice crop is also shown in the same paragraph, clauses N., O.

13. The annual rain-fall in Chumparun is variously stated from 21 inches to 66 inches, but it does not appear to average more than 48 inches; this alone is proof sufficient that artificial irrigation is, in most years, necessary for the rice crop, while in years of scant rain-fall it is indispensable to its safety.

14. Next to irrigation, protection from flood is essential in order to secure the rice crop over a large extent of the district. Mr. Metcalfe, in his memorandum, very forcibly shows this in the 10th and 11th paragraphs; and elsewhere the report teems with statements of the destruction done to the crops by the inundation. A complete system of embankments is the only possible remedy in such cases; they would not only ensure the safety of the rice crop over a large part of the district, but would enable the cultivators to extend the area under rice into the lowlands, now annually submerged by the floods to such a depth that cultivation is impossible.

15. A proper system of drainage of these swamps must go hand in hand with irrigation and embankments; the hollows and jheels would thus be converted into the most fertile land in the district. A glance at the map will show that the reservoir on the Doon Valley at the source of the Boor Gunduck, retaining the water of 126 square miles, must have an immense influence on the floods of that river, tending to moderate them; any spill from the Boor Gunduck on its right bank would be shut off by the embankment of the irrigation channel.

16. The scheme, as a whole, therefore, provides for irrigation, drainage, and the protection of the district from flood, the embankments thereby adding probably not less than 400 square miles to the rice-producing area of the country.

17. The rubbee crops consist principally of opium, wheat, and barley, and indigo; for all these doubtless canal irrigation will be acceptable. It is stated by Dr. Sconce, Civil Surgeon of Motiharee, in his report quoted by Mr. Stoney in his 5th paragraph, that the spring-water to a large extent contains salts, such as sulphate of potash and saltpetre; irrigation with such water as this merely perpetuates the evil caused by the efflorescence of the salts on the surface of the land, and does nothing to get rid of it; a good supply of fresh river water would no doubt wash the salts down into the soil and thus gradually get rid of them to the certain improvement of the cultivation.

18. Having shown the manifest advantages of the scheme as regards the increased produce on the land now under circulation, the extension of the culturable area, and the protection from flood, to which must be added increased facilities of communication and carriage of goods by the canals, I proceed to state what will be the probable revenue derivable from the project.

19. Captain Jeffreys, in his report on the Lower Gunduck Scheme, paragraph 118, assumes that a water-rate of Rupees 2–8 per acre may be levied, and certainly this cannot be considered as excessive; now supposing the whole area commanded by the canals, viz., 989,500 acres, were supplied with water on these terms, the return would be Rupees 24,73,750, from which must be deducted Rupees 2,68,160 for maintenance at Rupees 2¼ per cent. on the cost of the works, Rupees 1,07,26,426, there remains Rupees 22,05,340 as the net revenue, equivalent to Rupees 20¾ per cent. If only one-third of the area was irrigated, the return would still be nearly Rupees 7 per cent., and even from the small extent cultivated by opium only, as stated by Mr. Metcalfe in his 16th paragraph, if irrigated, a revenue of Rupees 3 per cent. nearly would be derived.

20. To the above must be added navigation tolls, but I have absolutely no data from which any reliable return can be calculated. Mr. Stoney in his report, paragraph 63, thinks Rupees 1,65,000 may be obtained, and this is a low estimate in my opinion, considering the large tract of forest-country opened up by the High Level Canal.

21. I now proceed to mention, briefly, the principal features of the project, referring the reader to the Executive Engineer's report hereto annexed for details.

22. The water of the Gunduck, as stated by Captain Jeffreys in the 7th paragraph of his report, was at its lowest in March 1868, when a discharge of 10,391 cubic feet per second was measured. Mr. Stoney, however, gauged it in a year of drought, making it 8,100 cubic feet per second. The river is at its lowest in March, after which it begins to rise gradually from the melting of the snows at its sources in the Himalyas; but even the volume here recorded, 8,100 cubic feet per second, is more than sufficient for the irrigation of the country cammanded by both systems of canals.

23. The full quantity required during the rainy season, when the greatest demand always occurs, is for the

| | | |
|---|---|---|
| Lower Project | - | 6,558 cubic feet. |
| Upper ditto | - | 3,682 ,, |
| Total | - | 10,240 ,, |

but during the cold season, nothing like this quantity will be wanted for the rubbee crop. Captain Jeffreys also notices this in the 39th paragragh of his report.

24. The original intention was to have placed the annicut at Nowrungeea, 15 miles higher up than Butsnra, the place finally selected. It was found, however, on investigation, that the river at the former place opened out to a width of 5¼ miles with several deep channels at intervals, *see* Drawing No. 8. The place now selected is favourable in all respects; there is a well-defined channel about 6,000 feet in width, a convenient length for the weir, taking into consideration the volume of water to be discharged over it; the river banks are above flood level, and the channel ra contracts and expands below, so that the water is partially backed up on the work and the trial to the weir thus lessened.

25. The design for the annicut, Drawing No. 13, is somewhat novel; but without incurring heavy expenditure there was no possibility of procuring cut-stone for the work. I have, therefore, proposed a vertical drop of 4 feet with iron plates for the coping and flooring, which it is calculated will be only half the

cost of cut-stone, while it is certain the work can by this means be much more rapidly executed and secured. The weir will be 5,938 feet in length between the abutments, and its crest 4 feet over the low water level of the river; the floor of the weir, as well as that of the head sluices and the sills of the regulating lock, must therefore be 3 feet below that level; some difficulty will no doubt be experienced in laying the foundations so low, but it is preferable to raising the water and thus increasing the trial on the annicut.

26. It is a question for consideration whether the weir might not consist of a simple flooring of brickwork overlaid with wrought-iron plates, on which a movable dam of wooden shutters, 7 feet high, might be fitted somewhat similar to the river dams or weirs in France, described by Captain Heywood, R.E., in the professional papers on Indian Engineering for April 1870, published at Roorkee.

27. For details regarding the anicut and description of the masonry works, I beg to refer to the Executive Engineer's report, Chapter IV.; the alignment of the canals, their dimensions and capacity are fully described in Chapter III.; to recapitulate here is therefore quite unnecessary.

28. A glance at Drawing No. 3 will show the immense area of the district periodically flooded by the Gunduck and Boor Gunduck Rivers; a tract of country not less than 500 square miles in extent is in fact submerged. Mr. Metcalfe dwells on this subject largely in the 10th, 11th, 15th, and 16th paragraphs and elsewhere in his memorandum. As I have before mentioned, it is proposed to construct a complete system of embankments from Butsura, the site of the head works, and above which no spill takes place, to the head of the Tirhoot system of canals at Doomurrea; this work should be executed in connection with the canals, and be so planned that the necessary excavation for the latter may be utilized for the formation of the embankments. In the scheme now sent up this has been arranged for; if they were constructed separately, the cost would be just 2 lacs of Rupees; in connection with the canal, the extra cost entailed is only Rupees 71,285, which sum the zemindars might fairly be called on to contribute if the canals are constructed.

29. There can, I think, be no question as to the absolute necessity for making these embankments, whether the proposed canals are constructed or not; the cost would be nearly as follows:—

| | Rs. |
|---|---|
| Embankment with land from Butsura to Doomurrea, 72¼ miles - - | 2,00,000 |
| Sluices in the above - - - | 25,000 |
| Embankment from Doomurrea to join the present system of the Tirhoot Bank at the Byah Nullah - - | 1,20,000 |
| Total Rupees - | 3,45,000 |

30. That the embankments may be made without danger is, I think, clearly shown in the Executive Engineer's report, paragraph 22, where he has entered closely into the subject, and, very conclusively I think, demonstrated that the water in the river would not be raised more than 6 inches at the place where the bunds are thrown up, and not at all below where the river is now confined between its embankments.

31. The arrangements, I have proposed for ensuring continuous navigation in this scheme, are different to those which have been adopted in Orissa, as well as in the Sone and the Lower Gunduck Projects. It will be remembered that in all these schemes the canals are reduced, in seasons of low supply in the feeding river, to a series of still-water reaches, the depth of water on the lower sills of the locks being so regulated in each case as to suit the circumstances of the navigation. In this project, as there is a superabundant supply of water in the river at all seasons. I propose to keep the full volume always flowing down, providing escapes sufficiently large and at the proper places to discharge any surplus water which the canal cannot convey by reason of its reduced width and consequent smaller carrying capacity; thus, at each large distributary or branch canal head, an escape will be provided capable of discharging as much water as that distributary or canal can take; a gauge would be established at each place, and when the water was seen to rise over the regulation level, a portion would be turned over the escape by the man in charge.

32. This is in every way, I believe, a better arrangement than that which has been rendered necessary in the projects named above, in consequence of the limited supply of water. A current will be maintained which will keep down the growth of weeds. It will be seen that the surplus water of three of the lines will be allowed to fall into the Tirhoot system.

33. It was mentioned in paragraph 3 that the north-western corner of the District of Chumparun was ultimately to be irrigated from a reservoir in the Doon Valley of the Soomeysur Range. As sufficient information has not been collected to enable us to prepare the detailed drawings of the masonry weir and sluice openings, and consequently the cost cannot be accurately arrived at, I refrain here from entering into any particulars further than to state that the project, as far as the investigation has gone, appears to be in every way most favourable; the plans and sections (Nos. 51 I. and II.) are forwarded for information, and to show what has been done, the Executive Engineer's report, Appendix C., gives some particulars regarding the volume that will be impounded at different heights, and the means that exist for filling the reservoir. It appears that fully to irrigate the area of country commanded by its canals, after making due allowance for evaporation and absorption, a height of 75 feet of water should be provided; the section shows this, and it will be seen that, owing to the favourable formation of the hills, the work is not very formidable. The remarks I have made in paragraphs 4 to 15 regarding irrigation apply equally to the country commanded by the reservoir and its canals; though intersected with hill-streams the want of irrigation is much felt, and large tracts of country are consequently left uncultivated.

34. Reviewing the project as a whole, I have no hesitation in saying that a more favourable scheme has never been submitted to Government. The works will be remarkably inexpensive and easy of execution; the slope of the country is only 1¼ foot per mile, consequently there will be but little lockage, and the works in this respect present a marked difference to those in the Sone Project, where the slope of the country is 3 feet per mile, and locks at every fourth or fifth mile thereby rendered necessary; there are in this scheme no heavy cuttings at the canal head, consequently the water soon reaches the surfaces of the country.

35. I cannot conclude this brief report without prominently bringing to notice the admirable manner in which the plans, sections, and detailed drawings have been got up by the Executive Engineer, Mr. Stoney. The mass of information collected by the survey parties is clearly shown on the large sheets 2, 3, and 51; in fact, they leave nothing to be desired. Beyond giving my advice and assistance occasionally, and explaining my wishes regarding the arrangement of the masonry works and canals, he has had no help, and, considering that latterly he has had charge of an important division with heavy works in progress, great credit is, I think, due to him. The annexed report, which gives a detailed account of the proposed project and description of the works, and contains, together with the detailed estimate, a mass of valuable information regarding the resources of the district embodied in the tabular statements, was entirely written by the Executive Engineer himself.

## CENTRAL PROVINCES.

From G. J. Nicholls, Esq., Officiating Commissioner of Excise, Central Provinces, to the Secretary to the Chief Commissioner, Central Provinces. Dated Camp Pendri, District Bilaspur, the 11th December 1878.

I have the honour to acknowledge receipt, under your endorsement No. 4861-236, of a copy of letter No. 328, dated Simla, the 4th November 1878, from the Secretary to the Famine Commission to your address, and I am required to submit a supplementary report as to the extent of the protection afforded by the existing canals and other means of irrigation, and as to the schemes which have been prepared or are under preparation for enlarging those canals, or for making new ones.

2. I have already written to you demi-officially, pointing out that it will be necessary to get the information in answer to paragraph 5 of the Commission's Memorandum from the Public Works Secretariat. The most important papers on the schemes enquired into in 1868-74, are detailed at page 118 of my printed answers to the questions of the Famine Commission.

3. I have carefully perused the Memorandum by the Famine Commission, and the answers given by me at pages 107-118 of my "Answers to Questions." The letter of the Secretary to the Commission is apparently a Circular-Letter, and does not imply that any fault is found with the information previously furnished. I have to regret, I believe, only one omission. At page 118 it would have been better had I quoted at length the orders of the Government of India in letter (M) No. 747 I, dated 14th December 1874, from the Government of India Public Works Department, Irrigation, to the Chief Commissioner, Central Provinces, desiring that no further investigation for irrigation schemes may be undertaken.

4. Taking up the subject in due order, I condense as far as I can. We have in the Central Provinces no irrigation canals, no jhils, nor have we any channels drawn from permanent rivers.

At page 111, I have given all the available information regarding the damming up small streams in Nimar. There is some irrigation from the Sur naddi in Ramtek, the Bhawantarri, a similar and almost parallel stream in the north of Bhandara, from the Arpa and Maniari in Bilaspur, and, perhaps, elsewhere; but all these streams cease to flow in the hot weather, save by percolation through their sands. Their waters are only used for cultivating sugar-cane and vegetables. Almost always our river beds are too far below the level of the surrounding country to permit of much irrigation from them, and I feel very doubtful whether an Irrigation Engineer would rank our largest rivers, the Mahanaddi, Sheonath, Wainganga, Tapti and Nerbudda, in those parts where they run through our wide plains as permanent rivers.

5. With the trifling exception above noticed, our irrigation is effected from tanks or ponds and from wells. The definition of "protected area" given in their Memorandum by the Commission, namely, "an area of which "a third part is or can be irrigated in a season of "drought by a canal drawn from a permanent river or "by wells not liable to dry up" would exclude all of our tank or pond irrigation. There are some small, I may say comparatively, insignificant areas irrigated from large tanks about Sahangarri in the south-east of the Bhandara district, which might be saved unless the drought were excessive, but these must be excluded from the list of protected areas. Much more so must the tank irrigated areas of Raipur, Chanda, Bilaspur and Sambalpur be excluded from such a list.

6. It follows, then, that what we have of protected areas are supplied from wells. But remembering that this is a Circular-Letter probably containing enquiries as to the condition of countries supplied by wells for the irrigation of cereals on a broad scale, as in the Doab below Cawnpore, and again, as to "regions near the "Indian desert," where without well irrigation the cultivation of grain crops is almost impossible, it will be necessary to discriminate between our irrigation wells.

Turning to paragraph I. (2) of the Memorandum of the Commission, it is asked to what extend the food crops of the district are protected.

For the purposes of the enquiry of the Famine Commission, I believe that "food crops" would not include the following perishable products or such as would have no appreciable bearing on the support of the people in a time of famine:—

1. Sugar-cane.
2. Turmeric, yams, pan gardens.
3. Onions, pepper, spices, garden vegetables.
4. Plantains,
5. Fruit trees, *e.g.* guavas, oranges, &c.
6. A very little wheat, barley, oats, peas, and lucerne, grown solely as early fodder—

and certainly ganja and opium cultivation must be excluded.

I have no statistics to go upon; perhaps in your office some may exist, but my strong belief is that the exclusion of these classes would leave us without any area protected from drought for food crops, if "crops" and "grains" be here synonymous in the following districts:—

1 Nagpur, 2 Wardha, 3 Balaghat, 4 Jubbulpore, 5 Damoh, 6 Seoni, 7 Mandla, 8 Narsinghpur, 9 Nimar, 10 Betul, 11 Chhindwara, 12 Hoshangabad.

There remain, 1 Upper Godavari, 2 Chanda, 3 Bhandara, 4 Sangor, 5 Bilaspur, 6 Raipur, 7 Sambalpur.

The well irrigation of these districts, however, is nearly all devoted to the crops which I think must be excluded. The total areas seem to be:—

| | | |
|---|---|---|
| Upper Godavari | - | 1,000 about? |
| Chanda | - | 12,044 |
| Bhandara | - | 18,363 |
| Saugor | - | 4,000 about? |
| Raipur | - | 2,000 about? |
| Bilaspur | - | 6,716 |

I cannot say how much of this area is cultivated with grain crops by the aid of irrigation, and how many of such wells are dependent on the local rain-fall. I believe they are mostly situated below the bund of tanks, and are used for irrigating rice-seed beds. But though they may effectually serve this purpose, and though the young plants may be raised so far as to be fit for transplanting, yet nothing can come of them in a drought; they will only wither and perish where they grow without being transplanted.

7. The question arises—whether with the prospect of disaster from drought some portion of the irrigated land ordinarily devoted to sugar-cane and the other excluded crops would not be used for cereals. If they were, the effect would be inapplicable. But I think that nothing of the sort would be done. These crops are far more valuable than cereals, even when the latter are selling at almost famine rates. Long before the occurrence of a drought could be realized, sugar-cane and yams would be far advanced, and garden areas are held by castes who do not cultivate cereals.

8. On re-consideration, and with the guidance of the Commission's memorandum, I think we must conclude that we have no area over which irrigation protects from drought the food crops of the district; using "food crops" as equivalent to "grain crops."

9. Still I think that I was right (I had not the figures for Sambalpur) in estimating that one quarter out of the 148,900 acres irrigated from wells, (all or very nearly all of which is cultivated with the crops which I exclude from "food crops,") and about 62,000 acres irrigated from tanks, (nearly all devoted to the same crops,) are scarcely so dependent on local rain as to fail, except under an unprecedented drought.

10. I have the honour to submit a statement showing the areas irrigated from different sources of supply as accurately as I can give them. I have added some particulars of population and cultivation which may be of use for reference. I have further added the maximum, minumum and average rain-fall for ten years past. At present the paucity of the population compared with our vast areas, the very great number of the separate plains or river basins, the necessity of vast reservoirs in the hills, before the mountain streams fed by the monsoon come down into the plains, and the very long lead from such reservoirs to the localities where their waters would be utilized, appear to me to be initial and insuperable difficulties.

As to the questions put in paragraph 3 of the memorandum, I have now given the figures. I believe that all of the area, with perhaps a trifling exception where the land depends on permanent wells, is liable to suffer from drought, and that practically none is protected.

11. Passing on to the 4th paragraph—what areas can be considered as requiring protection by means of irrigation? The parts especially exposed to drought are enumerated by me at pages 87-90 of my printed answers. They are (1) the Murwara tahsil of Jubbulpore, the Banda tahsil of Saugor, and the intervening part of the

Hatta tahsil of Damoh, below the Vindhya range; (2) the rice country of Bilaspur and Raipur; (3) the rice fields of Balaghat, Bhandara and the north-east of Chanda.

12. The Murwara tahsil, the north of Damoh and the Banda tahsil of Saugor have no rivers coming into the plain from the Vindhya range, and they are ill supplied from other directions.

13. In the Raipur district which I have just visited, and in Bilaspur, where my camp now is, the streams which come from the Maikal hills and the southern hills of Panabaras in Chanda, Kankeir, and even the Mahanaddi, have all their upper courses, and generally the feeders of the Sheonath their entire courses, through tracts of black cotton soil, where expensive irrigation is hardly wanted. At this moment, in sight of my tents are scores of acres of an inferior sort, but still of remunerative sugar-cane, growing well without any watering. From the west of Raipur up to Drug and Simgah, there is little else than black cotton soil. Here and there the highest parts, where the land is in rolling plains, the tops are capped with laterite formation, yielding only rice, but for this land the high levels would render a system of irrigation from the rivers I think out of the question. In this black soil part of the districts there is much rice cultivation in embanked fields, the embankments being generally slight. Early ripening varieties of rice are cultivated, and as soon as this is cut, unless the ground has become too hard (and apparently without further ploughing or preparation) linseed, massoor, batana, or some other pulse is sown broadcast, and the fields generally yield a tolerably good second rabi crop.

Another very prevalent combination of crops is to sow broadcast early in the rains in the same field arhar (or tur), tilli and kodo. Tilli ripens early, and if it succeeds is a very valuable product; the kodo is now being gathered, and therefore is later in ripening than in the hills or when sown alone. The arhar is a rabbi crop.

With facilities for irrigation these rice fields might during the rains be watered at the critical time, and this would prevent the ground from hardening and so secure the second crop of linseed or pulse, but after a favourable sowing of linseed or such pulses no flooding of the land is desirable, and irrigation for fields where arhar, tilli and kodo are being grown would be not wished.

In Bilaspur the black cotton soil extends eastward as far as Bilaspur itself. Again on the south of Raipur the black soil extends from the southern border northward considerably beyond Dhamtari and Balod.

14. This part of Chhattisgarh probably would be more benefited by irrigation as a protection than the Nagpur country, but I think the difficulties would be greater.

15. The clay, alluvial, laterite and sandy soils which produce rice only are in Raipur and Bilaspur, almost exclusively confined to the lower part of the Mahanaddi, Sheonath and Hasdeo, and to store water in the hills and to lead it for such long distances to a great extent through the lands of feudatory chiefs and non-feudatory zemindars and through black cotton soil areas where it is seldom wanted, would be a work of vast expense, and where we have such a scanty population one of very doubtful necessity.

16. I am not sure that the question of the probable effect of irrigation on a large scale would have on the general health of the people has been fully considered, but I should think that a water-logged black soil country under a hot sun would be a far more serious matter than even the reverse side of the irrigation question in Mozuffernugger.

17. The remaining field is that of the rice lands of Balaghat, Bhandara and part of the Chanda district. Here perhaps it might be found possible to construct reservoirs in the hills of Saleye Tekri and to utilize the waters of the Bagh Naddi, perhaps even of the Wainganga. By far the greater part of the tolerably good rice land is already cultivated. But here, as in Chhattisgarh, I am inclined to think that the first effect of the introduction of any Government irrigation system would be to concentrate the population on the parts affected, and for a considerable time to throw back the spread of cultivation, to check the formation of habits of enterprize and frugality, and to lower even further the standard of industry, and independence of living.

18. In Nagpur, I think, the effect would be, not to increase the production of cereals, but the contrary. The area so irrigated would mostly be given up to fruits, vegetables and luxuries, mostly perishable articles, not of much value to the country at large in facing a famine. This irrigated area would soon be crowded with a rapidly multiplying, and finally a dense population, while other areas would be retarded. I doubt whether the country at large would be the happier, the healthier, or better for it.

19. In the Nerbudda Valley it would seem that more damage has been caused by excess of rain than by drought, especially if we add losses from unseasonable rains in the cold weather, and blight from cloudy weather, a moist atmosphere and cold winds.

In the last rainy season 1878–79 Nimar, Wardha, part of Chanda and Nagpur have suffered from an excess of rain, or perhaps, more strictly speaking, from an absence of seasonable alternations of rain and sunshine.

20. I have elsewhere noticed that I thought in the calculations of the expected revenue from the Nagpur projects, that some crops had been counted as likely to be irrigated, regarding which I believe that, save in very extraordinary years, not a drop of water would be taken by the cultivator.

21. Regarding paragraph 5, (3) I would add that the Nagpur and Wardha schemes were intended for the benefit of lands already cultivated and inhabited, and this would apply to all or very nearly all that could be attempted in the belt under the Vindhya hills in Saugor, Damoh, and Jubbulpore, in the rice lands of Chhattisgarh and of the Wainganga Valley.

22. For my own part, I think that the people, if taccavi could be obtained more easily and were to be collected rather less stringently, would do all that is requisite for themselves. In Chhattisgarh, however, there is one most ridiculous but most potential hindrance to the employment of capital in the improvement or protection of villages by the construction of tanks. The custom appears to be too strong for any one to break through it. Each tank among this Brahmin-ridden, witch-murdering, superstitious people has to be "married." The cost of the "wedding" of a tank is about four rupees for a wooden post erected in the middle of a tank, and often hundreds of times as much to be spent in feeding and feeing Brahmins. As a rule, the cost of the wedding greatly exceeds the cost of the construction of the tank. Within the last fortnight I have seen and inquired into the cost incurred in connexion with very many tanks. One not far from my camp cost Rs. 800 in labour, while Rs. 2,000 were spent in the "marriage" foolery. This is not a very unusual proportion. A man's reputation and respectability are held to depend on the amount of money he thus squanders, and it follows that these improvements to the land cannot be carried out on commercial or business principles. I believe that there is a great deal of money in the country which would be most willingly and gladly spent on tank construction, but for this pernicious, superstitious folly.

23. There are difficulties in the construction of wells which the people of this part often cannot unaided get over. Sometimes, after considerable expenditure, a hard layer of rock is met which they cannot penetrate with their indifferent tools and poor blasting powder, and in the sandy soils they have not yet been directed to or have not hit on a good plan for preserving the shaft from falling in.

24. I think the greatest benefit that Government could effect would be, first of all, by strictly limiting the almost prohibitive tank "wedding" expenses, by facilitating the giving and easing the process of recovering taccavi advances, and attending to the subject of arboriculture in these almost treeless plains of Chhattisgarh. The effects of trees in mitigating the severity of droughts, in equalizing the rain-fall, in retaining moisture, in increasing the fall of dew, are all established and acknowledged facts. Then, again, many of our trees, especially the mhowa, mango, tamarind, chironji, tendu, ber, and others, yield food which in times of scarcity is now a great stand-by to the poorest classes. Here, too, manure is wanted; but what ought to be used as manure, is, under necessity, burnt as fuel. A tract of country in these two districts can be pointed out, hardly less than 6,000 square miles in extent, where cowdung cakes form the chief, often the almost exclusive fuel of the people. The people of themselves will never form fuel and food-yielding tree preserves or groves. If the work is ever done, it must be done by Government; and I think that not only indirectly, but also directly, a great return on the necessary expenditure would quickly result.

25. No further observations which promise to be of any value now occur to me. You are aware that I am writing this reply from camp, away from books of reference, and I trust that the Chief Commissioner will overlook my shortcomings and the unavoidable delay which has occurred.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | Rainfall. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| District. | Irrigated land in acres. | | | | Protected from— | | Area. | | | | | Ratio of population to | | | | | | | |
| | Canals. | Channels from rivers. | Tanks. | Wells. | Tanks. | Wells. | Cultivated. | Culturable. | Uncultivable waste and forest. | Total. | Population. | Cultivated land. | Cultivated plus culturable. | Total area. | Area of cultivation plus land for each soul. | Land Revenue per head of population. | Average for 10 years 1868-1877. | Maximum recorded. | Minimum recorded. |
| Nagpur - - | | | 10,792 | | | | 1,084,044 | 349,332 | 336,353 | 1,769,729 | 631,109 | ·58 | ·44 | ·35 | 2·27 | 1·31 | 41·07 | 56·99 | 25·49 |
| Bhandara - - | | | 266,654 | | | | 715,098 | 767,561 | 625,153 | 2,108,012 | 564,813 | ·78 | ·38 | ·27 | 2·62 | ·74 | 49·26 | 61·83 | 30·72 |
| Chanda - - | | | 150,442 | | | | 637,174 | 2,053,743 | 1,115,834 | 4,706,501 | 534,431 | ·83 | ·15 | ·11 | 6·72 | ·46 | 42·93 | 59·61 | 30·00 |
| Wardha - - | | | 4,494 | | | | 904,175 | 195,001 | 299,044 | 1,299,220 | 354,720 | ·39 | ·32 | ·27 | 3·10 | 1·45 | 34·21 | 49·37 | 25·68 |
| Balaghat - - | | | 15,329 | | | | 365,574 | 231,699 | 202,720 | 799,993 | 193,008 | ·53 | ·32 | ·24 | 3·06 | ·81 | 63·54 | 75·75 | 43·90 |
| Upper Godavari - | | | 4,616 | | | | 16,221 | 41,056 | 33,441 | 90,718 | 24,425 | 1·5 | ·43 | ·26 | 2·34 | ·82 | 41·26 | 55·67 | 28·58 |
| Jubbulpore - | | | 3,557 | | | | 820,898 | 582,357 | 495,452 | 1,898,707 | 528,859 | ·64 | ·37 | ·28 | 2·65 | 1·09 | 59·69 | 86·93 | 28·80 |
| Saugor - - | | | 5,530 | | | | 782,693 | 621,150 | 344,549 | 1,748,401 | 527,725 | ·67 | ·37 | ·30 | 2·66 | ·85 | 49·94 | 68·91 | 25·80 |
| Damoh - - | | | 1,501 | | | | 396,760 | 389,922 | 314,958 | 1,101,640 | 269,642 | ·67 | ·34 | ·24 | 2·92 | ·98 | 51·62 | 72·60 | 23·29 |
| Seoni - - | | | 17,411 | | | | 531,568 | 327,682 | 362,172 | 1,221,422 | 407,330 | ·76 | ·47 | ·33 | 2·10 | ·36 | 51·73 | 66·19 | 31·30 |
| Mandla - - | | | 1,199 | | | | 386,226 | 728,808 | 386,556 | 1,501,590 | 213,018 | ·55 | ·19 | ·14 | 5·23 | ·46 | 51·19 | 68·95 | 30·80 |
| Betul - - | | | 11,970 | | | | 632,959 | 702,018 | 265,993 | 1,600,972 | 284,055 | ·45 | ·21 | ·17 | 4·70 | ·68 | 40·16 | 58·16 | 20·74 |
| Hoshangabad - | | | 2,561 | | | | 872,216 | 284,296 | 290,815 | 1,427,327 | 440,186 | ·50 | ·38 | ·31 | 2·58 | ·97 | 44·51 | 66·65 | 29·69 |
| Narsinghpur - | | | 3,789 | | | | 594,451 | 133,404 | 351,447 | 1,059,302 | 339,395 | ·57 | ·46 | ·32 | 2·14 | 1·24 | 50·54 | 75·61 | 17·63 |
| Chhindwara - | | | 7,702 | | | | 596,387 | 595,289 | 269,694 | 1,272,329 | 316,695 | ·55 | ·29 | ·24 | 3·39 | ·89 | 42·26 | 51·57 | 25·71 |
| Nimar - - | | | 10,667 | | | | 331,523 | 287,651 | — | 599,174 | 211,176 | ·63 | ·35 | ·35 | 2·83 | ·84 | 31·15 | 38·51 | 21·61 |
| Raipur - - | | | 10,658 | | | | 2,180,794 | 2,784,077 | 1,693,758 | 6,658,629 | 1,983,405 | ·50 | ·22 | ·16 | 4·58 | ·59 | 49·82 | 72·24 | 35·14 |
| Bilaspur - - | | | 196,161 | | | | 1,069,422 | 1,180,523 | 2,244,796 | 4,494,747 | 715,398 | ·67 | ·32 | ·15 | 3·14 | ·39 | 47·54 | 80·63 | 21·29 |
| Sambalpur - | | | 79,515 | | | | 719,720 | 1,079,077 | 1,087,703 | 2,886,500 | 423,634 | ·58 | ·23 | ·14 | 4·25 | ·27 | 37·37 | 70·47 | 11·64 |
| Total - | | | 804,528 | | | | 13,610,503 | 14,104,811 | 10,531,998 | 38,247,310 | 8,173,824 | ·69 | ·29 | ·21 | 3·39 | ·75 | | | |
| Amritsar, Punjab | 114,963 | | 156,665 | | 271,628 | | 766,720 | 110,720 | 122,240 | 999,680 | 852,750 | 1·08 | ·93 | ·83 | 1·05 | 1·21 | | | |
| North-Western Provinces - | 1,239,882 | not stated. | | | 1,239,882 | by canals. | 26,990,926 | 7,749,433 | 17,357,450 | 52,097,809 | 31,268,747 | 1·15 | ·90 | ·69 | 1·66 | 1·37 | | | |
| Muzaffarnagar - | N.W.P. | — | | | — | | 699,022 | 268,563 | 153,894 | 1,061,989 | 724,586 | 1·03 | ·79 | ·68 | 1·23 | 1·68 | | | |
| Jounpur - - | | | | | | | 610,726 | 289,440 | 95,680 | 995,846 | 1,077,162 | 1·76 | 1·90 | 1·09 | ·83 | 1·16 | | | |
| Fyzabad (Oudh) - | 352,82[2] | not stated. | | | 332,822 | | 607,232 | 227,242 | 246,082 | 1,080,556 | 1,024,092 | 1·68 | 1·22 | ·95 | 1·05 | 1·16 | | | |

No. $\frac{332}{236}$

From A. L. H. Fraser, Esq., Assistant Secretary to the Chief Commissioner, Central Provinces, to C. A. Elliott Esq., C.S.I., Secretary to the Famine Commission, Simla.—Dated Nagpur, the 18th January 1879.

1 am directed to acknowledge your letter No. 328 dated 4th November last, and to forward copy of a letter dated 11th ultimo, from Mr. Nicholls, being a supplementary report on the subjects mentioned in the memo. forwarded therewith.

2. I am also to state the Chief Commissioner's own views on the various matters of principle or theory involved in the inquiry made in that memo. And, first, in regard to the irrigated area, I am to refer you to page 107 of Mr. Nicholl's original "Answers," where the figures given are :—

| | | |
|---|---|---|
| Area irrigated from tanks | 626,846 | acres. |
| ,, ,, ,, wells | 148,056 | ,, |
| Total - - | 774,902 | ,, |

The irrigation from tanks is practically confined to the districts of Bhandara, Chanda, Bilaspur and Sambalpur. The figures given above refer to the first three districts only.* It need only further be remarked that there is no canal irrigation in these Provinces; and that the irrigation from rivers (*e.g.*, the Soor in Ramtek and Bhawantari in Bhandara) is quite insignificant.

3. In paragraph 5 of his letter of 11th ultimo, forwarded herewith, Mr. Nicholls points out that, with insignificant exceptions, no part of the irrigated area of these Provinces can be considered as "protected." This view appears to the Chief Commissioner to be correct; as a tank can hardly be said completely to protect an area irrigated from it, unless it is capable of holding a two years' supply of water: *i.e.*, sufficient water for the requirements of the land from the close of one monsoon until the commencement of the monsoon of the year next but one following. Only such a tank could protect its irrigated area against the contingency of a year of *complete failure of rain-fall*; and few of the tanks of these Provinces are of such a character. The contingency of two successive years of complete failure of rain-fall is probably too remote to call for consideration.

4. Mr. Nicholls appears to the Chief Commissioner to be also correct in asserting that the well-irrigation of these Provinces affords little or no protection to food-crops; because it is almost exclusively devoted to such articles as sugar-cane, vegetables, &c., which are perishable and would go but a short way towards the food supply of the population. I am to append a table showing the area under well-irrigation in each district, and the area under sugar-cane and vegetables, nearly the whole of which may be held to be irrigated from wells. From this table it will be seen that, deducting the area under these articles from the total area under well-irrigation, a very small margin remains in any district to be assigned to ordinary food crops. Moreover in a year of failure of rain, probably few of the wells would yield sufficient water to save any appreciable area of crops.

5. Mr. Nicholls' conclusion (stated in paragraph 8 of his present letter) seems therefore to be correct: *viz.*, that practically no part of this Province is protected by irrigation. In his original "Answers" (page 117) he had expressed an opinion that one-fourth of the land irrigated from wells and one-tenth of that irrigated from tanks might be regarded as "protected" or independent of the local rain. These proportions are apparently not founded on any trustworthy statistics, but on a rough estimate by Mr. Nicholls. His view, however, does not commend itself to the Chief Commissioner. Mr. Morris does not think that much of the irrigated land of these Provinces can be considered "independent of the "local rain," unless the word "local" be taken in a very narrow sense. Except in the mere matter of the *regular distribution* of the water supply, the wells are generally just as dependent on the rain-fall as the areas irrigated from them.

6. In paragraph 3 of the memo. forwarded with your letter under reply, it is stated that the examination of the figures showing what extent of irrigated land each district contains will show what parts of the country are most in need of water. The Chief Commissioner desires me to point out that, in this connexion, the fact must not be overlooked that different districts are frequently (for the most part) under different crops, and that thus districts where there is little irrigation grow crops which require little water, and *vice versâ*. Thus Wardha, with only 4859 acres of irrigated land, probably stands less in need of improved irrigation than Bhandara, with 320,863 acres; simply because cotton, jowari, wheat and linseed are the staples of the former, and rice of the latter district. Moreover a district with less irrigated area may be less liable to deficient rain-fall than one with more.

7. With reference to paragraph 4 of the Commission's memo., it has been already pointed out that no part of these Provinces can really be said to be completely protected. And the enumeration of the regions most exposed to drought made by Mr. Nicholls in the 11th

* If the figures (79,515) for Sambalpur be added, we have a total irrigated area of 854,417.

paragraph of his letter, herewith forwarded, appears to the Chief Commissioner to be correct. That officer has gone fully into this matter in pages 87–96 of his original "Answers"; and Mr. Morris desires here to endorse his view, that in the Jubbulpore and Nerbudda Divisions, and in the western portion of the Nagpur Division, damage is more frequently done by excessive and unseasonable rain than by drought; and that (with the exception perhaps of the northern portions of the Jubbulpore, Saugor, and Damoh districts) these parts of the Province are little liable to famine from drought.

3. The possibility of extending irrigation.

8. In relation to the possibility of extending irrigation, I am to forward a resumé of the irrigation schemes which have been considered in these Provinces, drawn up by the Chief Engineer. Of these, the scheme which commended itself to the Chief Commissioner was the Ramtek reservoir project. It seemed a feasible undertaking because "the advantages both to the cultivators of the tract to be irrigated and to the people of the surrounding country would be very great; and the scheme would afford a fair crucial experiment on the value and success of irrigation works in the Nagpur country." (*Vide* letter No. 5664, dated 14th October 1872, from Secretary Chief Commissioner, Public Works Department, to Secretary Government of India, Public Works Department.) The scheme was intended for the protection of land already cultivated and inhabited, against the contingency of drought and famine. But the extent to which it would be found useful was admittedly matter of conjecture. "Whether the Nagpur ryots will take water, and what "they will pay for it, are and must remain," the Chief Commissioner then wrote, "matters of individual opinion "until tested by actual experiment." And one of the great inducements to undertake this scheme was to bring this question out of the sphere of conjecture into that of ascertained fact. The same reason exists still; and the need of protection is certainly not less clear than it then was. At the same time, the Chief Commissioner does not consider the local need of this scheme so great as to justify his proposing to expend Provincial revenues upon it, or even to guarantee from them the outlay on it. As an Imperial scheme, undertaken by way of crucial experiment in protection against famine, it seems feasible; but it is not one with which the local resources can fairly be burdened at present.

4. The obstacles to the further extension of irrigation.

9. Probably the enquiry under this head is not intended for this Province; as apparently it applies mainly at least to canal irrigation. It seems to the Chief Commissioner doubtful whether any possible extension of tank or well-irrigation here would have any appreciable effect in averting famine. For, on the one hand, however liberal the takavi rules were made, the people would not readily incur the expense of constructing wells and tanks which would probably only be of advantage in one year out of three or four; and, on the other hand, even if they were constructed, they would probably themselves fail in years of drought when famine was imminent. As, however, the question asked by the Commission is evidently concerned with canal irrigation, it is unnecessary to dwell further on this point.

| | Irrigated. | | | Planted with. | | | Balance of irrigated land. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | From Tanks. | From Wells. | Total. | Sugarcane and Opium. | Vegetables. | Total. | | |
| Nagpur | — | 12,492 | 12,492 | 1,557 | 10,023 | 11,580 | 912 | |
| Bhandara | 302,500 | 18,363 | 320,863 | 8,141 | 6,312 | 14,453 | 306,410 | |
| Chanda | 134,901 | 12,044 | 146,945 | 4,351 | 9,155 | 13,506 | 133,439 | |
| Sironcha | — | 4,616 | 4,616 | 6 | — | 6 | 4,610 | |
| Wardha | — | 4,859 | 4,859 | 617 | 1,029 | 1,646 | 3,213 | |
| Balaghat | — | 10,287 | 10,287 | 2,433 | 926 | 3,361 | 6,926 | |
| Jubbulpore | — | 3,949 | 3,949 | 2,463 | 912 | 3,375 | 574 | |
| Saugor | — | 4,507 | 4,507 | 4,280 | 2,331 | 6,611 | 2,104 | |
| Damoh | — | 1,271 | 1,271 | 906 | 660 | 1,566 | 295 | |
| Seoni | — | 18,451 | 18,451 | 1,142 | 673 | 1,815 | 16,636 | |
| Mandla | — | 1,219 | 1,219 | 802 | 2,696 | 3,498 | 2,279 | |
| Narsinghpur | — | 2,455 | 2,455 | 2,381 | 2,259 | 4,640 | 2,185 | |
| Hoshangabad | — | 6,892 | 6,892 | 6,293 | 1,115 | 7,408 | 516 | |
| Nimar | — | 9,257 | 9,257 | 404 | 834 | 1,238 | 8,019 | |
| Chhindwara | — | 7,702 | 7,702 | 6,303 | 3,121 | 9,424 | 1,722 | |
| Betul | — | 12,163 | 12,163 | 10,301 | 2,944 | 13,245 | 1,082 | |
| Raipur | — | 10,813 | 10,813 | 31,852 | 4,754 | 36,606 | 25,793 | |
| Bilaspur | 189,445 | 6,716 | 196,161 | 5,669 | 3,690 | 9,359 | 186,802 | |
| Sambalpur | — | — | 79,515 | 10,520 | — | 10,520 | 68,995 | |

*Kanhan and Ramtek Irrigation Projects.*

In November 1870, an estimate amounting Rs. 1,02,51,960 was submitted to the Government of India for work connected with the Kanhan irrigation project, and at the same time the views of the Chief Commissioner (Colonel Keatinge) regarding this project were also intimated, but in reply (*vide* No. 6101., of 17th October 1871) Government of India desired that a less expensive scheme may be devised at a cost not exceeding Rs. 12 to 15 lacs, and that Colonel Rundall, the Inspector-General of Irrigation Works, should be consulted as to whether a reduced project on the same site is not feasible. Copy of this letter (*vide* No. 222, of 27th October 1871) was then sent to the Executive Engineer, with instructions to complete all the designs, drawings, and estimates he had on hand for the extended undertaking, and Colonel Rundall, Inspector-General of Irrigation Works, also furnished with copy of the Government letter, and his special attention invited to the prospects and action of the Irrigation Department in the Central Provinces.

In October 1872 (letter No. 5,664), plans and estimates amounting to Rs. 19,29,128 for the Pench anicut and Ramtek reservoir projects were submitted to Government, but these were again returned (No. 421., of 24th January 1873) for further reduction in the cost, in accordance with a note drawn up by the Inspector-General of Irrigation Works. On receipt of this, Mr. Hooper, Executive Engineer, was requested to remodel the Ramtek reservoir project.

A memo. by Chief Engineer (Mr. Armstrong) on Mr. Hooper's proposals for remodelling the Ramtek reservoir project was forwarded to Government with No. 4,031, of 1st August 1873, and early orders solicited. Government then forwarded a note drawn up by the Inspector-General of Irrigation Works on Chief Engineer's memo., with intimation that the views expressed by Colonel Rundall have been fully concurred in by his Excellency the Governor-General.

On receipt of this, Government were asked (*vide* Central Provinces, No. 5,834, of 6th November 1873) whether the embankments across the reservoir at Ramtek on the Soor river should be constructed of earth or masonry, and also suggested that Mr. Hooper should visit the irrigation works at Poona and Madras, in view to his making himself acquainted with the construction of masonry dams, tanks, &c. In reply (*vide* Public Works Department, No. 895 I. of 24th December 1873), Government stated that the object with which the Inspector-General of Irrigation Works recommended Mr. Hooper's visit to inspect the Madras tanks, was expressly that he should see that earthen and not masonry bunds were invariably in use in that Presidency, and the manner and dimensions of which they are constructed; this led to the Under Secretary to Government of Bombay, Irrigation Department, and the Chief Engineer of Irrigation, Madras, being addressed as to what irrigation works should be visited by Mr. Hooper, and on receipt

of their replies, Mr. Hooper, Executive Engineer, was instructed to proceed on his tour through the Bombay and Madras Presidencies. No report seems to have been made by Mr. Hooper on the result of his investigations, but plans and estimate amounting Rs. 9,61,058 for a revised project for the Ramtek irrigation were sent in by him in September 1874, which were submitted to Government of India, with Central Provinces, No. 6,318A., of 25th September 1874, and in Public Works Department, No. 7471., of 14th December 1874, Government expressed their inability to sanction the project on so extensive a scale with so little prospect of a remunerative return, and ordered that no further investigation for such schemes be undertaken, as it was considered undesirable to undertake at present irrigation schemes in the Central Provinces.

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## AJMERE.

The accompanying statements contain the figures on which chiefly the following remarks are based :—

I.—Areas irrigated by, and normal water revenue of Government tanks.

II.—Classification of the tanks according to their capacity for irrigation.

III.—Areas actually irrigated from the tanks from 1874.

IV.—Areas assessed as irrigable from the old tanks, and from wells, with per-centages of the cultivated area irrigated, manured, under rabi cultivation, &c.

V.—Estimate of the probable area which would be culturable in a year of drought.

VI.—Statement of the new irrigation works under construction and proposed.

*I.—The areas now irrigated or irrigable from different sources of supply.*

2. The areas capable of being irrigated are—

| | Acres. | Acres. |
|---|---|---|
| I.—From tanks— | | |
| Old tanks recorded in the Settlement papers - - - - | 17,227 | |
| New tanks, estimated area not yet attained - - - - - - | 5,087 | |
| | | 22,314 |
| II.—From village works (see Statement IV.) | | |
| Talabi land, total recorded - 18,461 | | |
| Deduct area irrigable from the old tanks (as above) - - 17,227 | | |
| | 1,234 | |
| From wells - - - - | 33,488 | |
| | | 34,722 |
| Total area irrigable - - | — | 57,036 |

This is 33 per cent. of the total cultivated area of the district. It will be noticed that the difference between the area culturable and that actually under cultivation is great, but it would seem to be necessary that a very large proportion of the culturable area should remain uncultivated, as very nearly the same difference occurred in the former settlement. The proportion of the cultivated area which is irrigated varies from 15 per cent. in the Gangwana circle to 55 per cent. in the Todgarh circle (see statement V.).

3. The high percentages in some of the circles may at first sight appear to be satisfactory, but they will be found to be less than the per-centages manured, and in that respect give rise to a doubt whether some portions of the district are not over-irrigated. The large areas of land covered with water at the end of the rainy season, the number of fields uncultivated in the rear of many dams, the careless way in which irrigation is conducted, the unconcern with which waste goes on, and other similar signs, tend to the conclusion that water is in many places too plentiful, and of but little value.

*II.—The extent to which such irrigation protects from drought the food crops of the localities in which the works exist.*

4. This must be in a great measure guess work. The whole of the tanks depend on the local rainfall for their supply of water, consequently only those which hold more than enough for one year can be of use in a season when rain fails. Unfortunately, a season of severe drought in this district succeeds one or two seasons of short rainfall, and there is not in the district one tank that can hold sufficient water to meet such a state of things.

5. All the tanks then must be expected to fail in a year of severe drought in supplying water for direct irrigation; but they are not therefore wholly useless, as the experience of the famine of 1868–69 proved. The rainfall then was extremely light, but the large tanks caught enough to moisten a portion of their beds, and the soil having been enriched by the deposit from the water stored in previous years, luxuriant kharif crops are said to have been produced in the area ordinarily submerged in the large tanks.

6. After this famine it was proposed to construct more and better tanks, which it was hoped would protect large areas from the effects of drought. It was required however that the works should give a fair return; and to do this water must be issued for irrigation. To get the best return, the whole of the water collected in any rainy season should be used up in the irrigation of the crops of the cold weather immediately following, so as to save the great loss by evaporation in the succeeding hot season.

7. This has not been done yet, and very probably will not be done, when the tanks fill, as the supply is too variable to allow of the whole of the land commanded being irrigated regularly. In 1875 and 1876 the new tanks received a good supply of water, and irrigation was rapidly extending, particularly in the succeeding hot seasons, for cotton. The area of the crops irrigated in the hot season of 1877 from the supply left over from the previous year was in excess of the area in both fasli of 1876–77; but the rainy season of 1877 being a bad one, the tanks, new as well as old, were all emptied by the middle of October, and there was not any irrigation during the cold season following (1877–78).

8. It is thus evident that the new tanks will under the present system be as useless for direct irrigation in a year of severe drought as the old tanks. The only way in which they can be made of use at such a time is to consider them simply as storage reservoirs, and never to run off the water for irrigation in any season. Under such conditions they would not pay by any direct returns, but they would keep up a supply of water in wells below for a long distance down the nullahs. It may be doubtful how far it would be worth while to build expensive dams to secure this result, as the extent of the benefit is not easily estimated; but there is no doubt whatever that the wells below all dams in this district have their supply of water largely increased, and the benefit is felt as long as there remains a good supply of water in the tanks.

9. The most constant supply of water for irrigation is obtained from wells; but, as might be expected from the remarks just made, many of the wells fail when the tanks dry up; but when there is a good depth of soil below a large tank, wells generally can be depended upon. Where much silt has accumulated also, the wells seldom fail. In the famine of 1868–69 the wells in such localities saved the crop over large areas.

10. The extent to which protection against the effects of drought exists in this district has been roughly estimated in Statement V. annexed, of which the following is an abstract :—

| ——— | Kharif. | Rabi. |
|---|---|---|
| | Acres. | Acres. |
| Tank irrigation (talabi) will fail entirely and the area will be - - | Nil. | Nil. |
| Well irrigation (chahi) will go on only where there has been a supply of water in a tank or where there is a large accumulation of silt; probable area - | 13,743 | 6,393 |
| Submerged land (abi) will be culturable in the beds of most of the tanks during the kharif only, and in the rabi in the beds of any large tank in which water may have remained; also in the Saraswati valley (Pushkar) - - | 5,806 | 412 |
| Total area protected - - | 19,549 | 6,805 |

But owing to the water becoming brackish, and to the cattle being unequal to the usual amount of work per-

formed by them, the produce in such a year as that supposed would be much less than in an ordinary season, being equivalent (see remarks in statement) to probably about 10,000 acres for the kharif and 2,500 acres for the rabi; or 6 per cent. of the average kharif and 5 per cent. of the average rabi.

11. This estimate is of course little better than a guess, and the only way of checking it would be to obtain the actual results during the famine of 1868-69, if forthcoming, and make allowances for any improvements since effected. I have not been able to find this information anywhere, but I have made inquiries in various parts of the district and based my calculations on the information supplied to me. I have endeavoured to make the best use of the materials at my disposal, and as it is upwards of eight years since I joined the Irrigation Division in this province, during which time not engineering points only, but also questions of the extent to which protection would be afforded by various projects, have been constantly under discussion, it will be seen that I have had a considerable time for my inquiries and for my conclusions to mature.

12. That the "protected" area has not been underestimated will appear evident from Mr. La Touche's settlement report of 1875, in which it is stated regarding the last famine, that "the kharif had practically failed entirely. The water in the wells was scanty and had become so brackish that it was unfit for purposes of irrigation. In some places where the crops had sprouted, no grain, owing to lack of moisture, had been formed, and the stalks had been cut to feed the cattle. * * * * * In January, February, and March 1869, 1·2 inches of rain fell, but there was no barani cultivation, and the area under crop in the rabi was confined to those localities where well irrigation was procurable, for none of the tanks had any water."

### III.—*The Possibility of extending Irrigation still further.*

13. The several works now under construction and proposed are enumerated in Statement VI., but if the conclusions above arrived at be accepted, it is clear that neither by the improvement of existing works, nor by the erection of new works can much good be done towards mitigating famine under the present system; the beneficial effect of the works will be felt chiefly in good seasons only.

14. Irrigation in *most parts* of the districts would however appear to have been developed to the utmost extent desirable. It is indeed a question for consideration whether there is not already too much irrigation in some places. In the Todgarh Tehseel as much as 52 per cent. of the cultivated area is irrigated from either tanks or wells, while 19 per cent. only is manured (see Statement IV.). In every circle except Pushkar, the irrigated area is largely in excess of that manured, and the result is a deterioration of the soil where the water is at all brackish. In some places drainage operations are needed; and in all, as in other parts of India, it would be beneficial if more manure were put into the soil instead of being used for fuel.

15. As regards the schemes proving remunerative or otherwise, it has already been remarked that at first far too sanguine a view was taken as to the beneficial results likely to follow from the construction of new and improved tanks in this district. Owing to the absence of data also, sufficient allowance for a short supply of water in most years was not made, and the returns were in consequence over-estimated. It is still doubtful whether the reduced returns now looked for will be fully realized; but each year shows more clearly that the water is worth more than is charged for it even on the new tanks. For the average rates charged from old and new tanks, see Statements Nos. I., II., and III. attached.

### IV.—*The obstacles to the extension of irrigation, whether arising from any kind of administrative inefficiency or the poverty and want of enterprise of the cultivators.*

16. The obstacles to the extension of irrigation are many; among them may be mentioned:—

(*a*.) Insufficient returns owing to the low water rates charged, which do not fairly represent the value of the water.

(*b*.) Insufficient returns, credited to the tanks.

(*c*.) Excessive cost of maintenance of existing works.

(*d*.) Want of enterprise, and poverty of the cultivators.

Each of these points will be alluded to in turn.

17. The rates at present charged on the old tanks are based on those in force in Northern India, where the conditions are wholly different. There rabi cultivation is carried on to a very great extent without irrigation; here rabi crops, if not irrigated, can be grown only in the beds of tanks as a rule. The connection between rabi cultivation and irrigated and submerged lands will be seen in Statements IV. (columns 10 and 11). Water then being essential to the growth of rabi crops, has here a higher value than where it can be dispensed with. The present rates of the old tanks are in many places much less than they were at the time of Colonel Dixon's settlement (1850), shortly after the tanks were first made and irrigation undeveloped.

18. The reason of the rates having been reduced would seem to have been because the assessment of land and water revenue together was found to be too high under the present inelastic system of not making remissions in bad years if the money could be possibly obtained from the villagers. As the high revenue was paid in good years without difficulty, it is reasonable to suppose that where actual irrigation only is charged for, the same water rates ought to be easily paid now-a-days unless there should be some special reason for the contrary in any particular case. In the rabi of 1874–75 (the first year of the current settlement) the *average* water rate realized in the Beawar Tehseel in the case of the variably assessed tanks was Rs. 9-11-0 per acre; the average of the whole district for the same fasl was Rs. 6·05 (see Statement III., column 2). This was abnormally high, no doubt; but it was paid.

19. Where the financial prospects of irrigation projects do not appear likely to cover all the expenses, including the charge of interest on capital, a special rate might fairly be charged on the land that may be protected; it is understood that this will be done at the next settlement to a certain extent in the case of the new tanks; but an additional remedy in this district would appear to be the raising of the water rates to such an extent as would fairly represent the value of the water used from both old and new tanks.

20. The current Settlement allows for only one-sixth of the produce being taken, probably a fair average in the case of the land revenue which is to be paid in good and bad years alike, but very little in the case of irrigation from tanks, the water revenue of which is increased or decreased according to the supply. One-third is I believe in the North-Western Provinces considered a fair share of the produce of land actually irrigated.

21. In reckoning the returns obtained from the outlay on tanks in this district, full credit has not hitherto been given them under the existing system of accounts. The indirect advantage of the increase of land revenue has not been properly taken into account where separate water rates are charged; and where there is no distinction between land and water revenue made, the latter is seldom fairly estimated. The tanks in Rajputana, especially in the hilly parts, have a most important influence on many wells, which often could not be constructed but for the tanks. It has been settled that half the excess of the revenue of well land over the soil rate shall be credited to the tanks for half the area of well land in the district; this is considered as too little rather than too much; but the credit is on the whole perhaps very fair.

22. The other items of indirect revenue should be a portion at least of the soil rate of submerged land and of land irrigated from the old tanks. The submerged land where culturable (abi) has generally been formed by the silting up of the tanks, and the irrigated area (talabi) would seldom be even cultivated at all but for the tanks. In fact, if the tanks were allowed to fall into disrepair and to become wholly useless, not only would the area now benefited by the tanks be uncultivated, but a large area of rain cultivation would also be allowed to remain fallow; whole villages would be deserted. Under these conditions, the increase in the rain cultivation over what it was before the tanks were constructed may be taken to represent the normal increase due to the prosperity of the district generally, while the increase in the soil rate on the submerged and irrigated areas would represent the increased land revenue due to the tanks; a portion of this at least should be credited to the tanks.

23. As regards the excessive cost of maintenance of the tanks in this district, they are so numerous and generally so small that Government cannot profitably carry out their supervision and maintenance; it would therefore appear to be expedient that steps should be

taken for imposing on the cultivators who benefit by the water, the duty of carrying out all necessary repairs for securing efficient irrigation. This principle should apply to all tanks, great and small, but at present perhaps to a different extent. The small tanks might be wholly kept in repair by the villagers, while only the repairs not needing skilled labour might be done by them in the case of the large tanks; in all cases, however, the water courses might be kept in order by them, the masonry and other works being small and not needing engineering skill.

24. The obligation might equitably be held to attach without any corresponding relief being given generally in the way of lower rent, though some measures of this kind might facilitate the carrying out of any change of the nature above suggested. Certain items of miscellaneous revenue, if made over to the villagers, would assist them in providing funds and at the same time tend to prevent waste of water and improve the resources of the tanks. The interests of the cultivators themselves would lead them, with a proper organization, to carry out the necessary repairs, except in the case of the larger tanks not wholly under their control; in this case it would be sufficient for Government to have the power to withhold water till the repairs might be executed, or to carry out the repairs at the cost of the irrigators.

25. It would perhaps be taking too sanguine a view to expect so sweeping a change to be acquiesced in by all the parties interested, and it might be desirable to reduce the revenue demand for a time in certain cases; but the sacrifice would be worth making. At present the cost of maintenance of the old tanks exceeds the water revenue credited to them. Of the whole number (459) of the old tanks, 6 per cent. only, or 27 of the largest,—those paying each more than Rs. 500 yearly water revenue, cost less than the revenue shown as derived from them. The cost of the remainder is one and a half times the revenue credited to them. There are doubtless same considerable indirect advantages due to many of the tanks; but special inquiry is needed to estimate the amount in each case.

26. By insisting on the villagers carrying out the repairs of the smaller tanks, about 95 additional tanks might probably be made to pay and about 108 more maintained without any, or with but little expense to Government; the remaining 229 (half the whole number) would involve a sacrifice of some Rupees 604 only of revenue. The net saving by the carrying out of the scheme would however be from Rupees 20,000 to 25,000 yearly. This result would be due to the greater interest the villagers would take in their tanks, and the consequent development of their resources to the utmost, the reduced cost of the repairs, and the large saving in the cost of establishment.

27. At present the repairs are all executed by the P. W. D. in a manner unsuited in most instances to the requirements of the case; it is as though the roads and buildings branch of the P. W. D. were employed to a large extent in repairing village huts; most of the tanks (the small ones) can as easily be repaired by the villagers as their wells; these tanks were mostly made by them. The larger tanks only require professional supervision. All the revenue is swallowed up in maintenance under the present system.

28. Till lately it was expected that ordinary repairs of tanks would be done by Zemindars. In Colonel Dixon's time they assisted in their construction, and in many instances wholly constructed their tanks. Of late years it has been held to be the duty of Government to do the repairs, and the liability of the villagers is gradually being forgotten. It seems to be considered by some that as Government takes water revenue from the villagers for irrigation from the tanks, it is only fair that Government should maintain the tanks; but it would appear to be forgotten that a much larger revenue was taken in Colonel Dixon's time immediately after the villagers had assisted in the construction of the tanks; if not forgotten, it may be remarked that a more equitable system is now necessary; but in reply to this may be instanced the land revenue system of assessing well land at a high rate, while the wells are entirely kept in repair by the villagers.

29. Generally, it would not be necessary to coerce the villagers or even greatly to reduce the revenue demand; it would in most cases be quite sufficient at the end of the present settlement for Government to make known that in future certain repairs would not be carried out by Government; the interests of the villagers themselves would lead them to keep up most of the tanks as they did before. In any case that it might not be their interest to do so, it would not be worth while for Government to keep up the tank. An organisation of the nature above alluded to (para. 24) would however allow of the change being made in most cases during the currency of the present settlement, at a considerable saving to Government, even if some remissions of revenue should be made in a few exceptional cases.

30. The villagers are doubtless in most cases very poor, as Mr. La Touche's settlement report shows. In one place he remarks, "there is just one acre per sharer "of cultivated land"—in the Todgarh Tehseel; and in another, "the people have always been a cultivating "tenantry, living from hand to mouth, and with no "resources beyond those of the current harvest;" and "the result of the famine has been to throw the district "into a state of indebtedness from which it is doubtful "if it will ever recover." They are also disinclined for work when they can avoid it; but under a proper system they will and do work. Colonel Dixon reclaimed them from being robbers, and caused them to settle down as cultivators. He also induced them to build tanks and to keep them in order, with but little assistance from Government.

31. The poverty of the cultivators doubtless frequently prevents them from carrying out improvements. They would often gladly take tacavi advances to deepen their wells, sink new ones, make nadees (small dams), &c., but it appears that there are difficulties in obtaining the advances. Probably the people have not security to give; but in a matter of this kind it would seem that the only security really necessary would be the work itself, the money being paid only on a certain portion of the work being done. I have been told that high interest has been paid to a Bania for money to sink a well, rather than obtain a tacavi advance from Government; what amount of truth there may be in this I cannot say, but it appeared to be thought by others present at the time that it was quite natural. One objection to taking an advance from Government was said to be the necessity of paying up the instalments with exact regularity irrespective of the seasons.

32. The want of enterprise in the cultivators is largely due to the existing system. They generally know what is necessary to remedy the defects of a tank, and would do it to the best of their ability if encouraged a little and helped when in difficulties; instead of this they know they have only to let things take their course and Government will do what is necessary. In Colonel Dixon's time the villagers were encouraged to help themselves; now they look to Government to do everything for them. The system is gradually tending to drive all energy and enterprise out of the people, and make them perfectly helpless in time of difficulty. A change of system commenced soon after Colonel Dixon's death; but the present system began probably at the last famine only.

33. There do not appear to have been any difficulties at one time in the way of preparing land for irrigation or the formation of water-courses; the villagers always did these things themselves, and have not till lately raised any objections; but now that Government is doing everything for them, they sometimes profess their inability to construct a channel from a new tank. Fields are not as a rule sub-divided into small beds; in the case of the new large tanks endeavours have been made to insist on this, but for the old tanks next to nothing has been done: no extra rate is leviable in any case; the only penalty is the infliction of a heavy fine after a regular inquiry in Court. This is too cumbrous a procedure to be of use except in extreme cases. In this and other matters connected with irrigation in this district simple rules and simple procedure are necessary.

34. If any little repair is needed to a small tank which cost a few rupees only (perhaps less originally than Rs. 100), and was constructed by the villagers themselves, a petition is sent to the district officer, who calls on the Executive Engineer of the Irrigation Division to do the work, it may be at a cost of Rupees 5 only, and perhaps at a distance of 20 miles from any other work; this would doubtless be an extreme case, but it differs from those constantly occurring only in degree. Unless water can be taken by flow, it is often not considered by the villagers as worth having; they would let their fields be uncultivated rather than raise the water, provided only they had enough crops to enable them to pay the Government demand for land revenue, &c. The saving of labour effected by obtaining water by flow instead of by lift only gives many cultivators an excuse for sitting idle in their villages all day long. When water can be obtained by flow, wells are often allowed

to fall into disrepair, even if a comparatively high rate has to be paid for the tank water. The whole tendency of the present system is thus to make the people more and more dependent on Government and less able to meet the strain of a famine.

35. I cannot conclude without offering an apology for the length of these remarks, particularly on branches of the subject foreign to my ordinary duties. The present appeared to me, however, to be an occasion when the opinion of one who, though not in the regular groove, has given much thought to the subject, might be not wholly useless. The conclusions I have formed may be summed up in a few words; the villagers need to be encouraged to help themselves and the performance of certain duties insisted upon; as water is generally scarce, tank irrigation should be restricted, not by withholding the water, but by raising the rates; well irrigation should be stimulated by offering every inducement for the extension of well irrigation. Greater facility in obtaining a suspension of the Government demands in bad seasons, or for other sufficient and special causes, would be considered a great boon, and tend more to relieve the cultivators from debt and the grasp of the bania than anything else. With such measures carried out in a liberal spirit, the prosperity of the district would be increased, and the people be better able to meet the next famine.

N. W. CULCHETH, C.E.,
Executive Engineer, Irrigation Division, Ajmere.

Ajmere, 6th January 1879.

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## BOMBAY.

### No. 1,110 P.—51 of 1879.

From the ACTING SECRETARY to GOVERNMENT, Public Works Department (Famine), Bombay Castle, 29th January 1879, to the SECRETARY to the FAMINE COMMISSION.

I AM directed to acknowledge the receipt of your letter No. 324, dated 4th November 1878, and to forward a memorandum No. 6364, dated 31st December 1878, drawn up by the Chief Engineer for Irrigation, under instructions from Government, containing the facts desired by the Famine Commission.

2. I am at the same time instructed to append the following papers bearing on the same subject:—

(1.) Minute by the Governor of Bombay, dated 16th May, 1878.
(2.) Minute by the Honourable J. Gibbs, C.S.I., dated 8th June 1878.
(3.) Programme of Irrigation Works for the next ten years.
(4.) Memorandum and Forecast of Expenditure on Irrigation Works for the five years ending 1883–84.

3. As regards the term "protection," I am desired to say that, for purposes of estimate, cultivated land is assumed to be efficiently "protected" when one-third of its area can be irrigated, but there is no reliable data available in this Presidency to show whether this axiom is even approximately correct. Bearing in mind, however, that the "protected" portion is usually the best of the whole, probably twice as valuable naturally as any other portion, and its productiveness is trebled or quadrupled by means of irrigation, His Excellency the Governor in Council is of opinion that a somewhat less proportion than one-third of the cultivated area would imply the "protection" of a large part of the total produce and a still larger part of the food of the people, and would save the so-called "protected" area from the effects of famine.

4. I am to draw particular attention to the fact that the "protection" afforded to the cultivated area of 387,311 acres in the Deccan by means of wells, &c.,—entered at 1,161,933 acres "protected,"—is only partial, inasmuch as this means of irrigation is very liable to fail during seasons of drought. A return of wells, used for purposes of irrigation, situated within the area affected by famine in 1876 and 1877, which failed partially or wholly during that period, has been called for from each Collector—not received up to date—but it is deemed undesirable to delay this reply any longer for further information. I am, however, to say that this return will be submitted to the Famine Commission hereafter.

5. Referring to head (4) of paragraph 1 and to paragraph 6 of the memorandum by the Famine Commission, His Excellency the Governor in Council is of opinion that, although here is no direct administrative inefficiency, still a special Canal Law is necessary for the proper administration of Canal irrigation in this Presidency, and I am desired to say that such a Bill is now under consideration in the Legislative Council.

6. Doubtless the poverty and want of enterprise of the Deccan ryot are among the many obstacles which at present impede the spread of Canal irrigation, and which have been so fully detailed by the local officers in their answers to Chapter IV., Question 23; but on this subject I am instructed to refer you to my letter No. 1,077 P. —492, Local, dated 24th September 1878, and to the remedy set forth in the 4th paragraph thereof, which in the opinion of this Government is more likely to be effectual than anything else.

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### No. 6,364 of 1878.

MEMO. by Mr. J. H. E. HART, Acting Chief Engineer for Irrigation.

In accordance with Government memorandum No. 705 I., dated 22nd November 1878, the undersigned has the honour to afford the following information in reply to the enquiries by the Famine Commission.

(1). The area now irrigated or irrigable from different sources of supply.

Statement No. I., attached, has been compiled from the agricultural statistical tables rendered by Collectors under despatch from the Secretary of State to the Government of India, No. 55, dated 24th June 1875.

The information comprises that given in the latest returns received to date. The figures generally relate to the year 1876–77, but in some cases the returns are for 1877–78. The year has been indicated in each case.

The areas irrigated in each Collectorate are shown in columns 4, 5, and 6. Those in column 6, showing the total area irrigated, were obtained from the Collectors' returns. Column 4 shows the areas irrigated from our new canals, &c., in the year to which the Collectors' returns relate. These were obtained from the irrigation officers' reports and represent the areas actually irrigated. The figures of column 5, showing the areas irrigated from wells, small tanks, and weirs across rivers and rivulets, were obtained by deducting the areas irrigated from our new canals, &c., from the total areas shown in the Collectors' returns.

Statement No. II. shows the areas under command and irrigable, and the area actually irrigated by our new canals during the year 1877–78.

(2.) The extent to which such irrigation protects from drought the food crops of the district in which the works exist.

On this point we have absolutely no data at present. Our works are all small (comparatively) and isolated, and the extent to which they protect the country cannot be ascertained by any statistics of the past years. The works are all of very recent construction; and from inexperience the people did not avail themselves nearly as extensively as they might have of the protection afforded.

One principal reason for this is that the people are unaccustomed to irrigation in ordinary years, and the explanation is that for want of storage works there is no permanency in the dry weather supply on many of the works hitherto brought into operation which would afford the means of irrigating the more valuable crops requiring water late in the season. This defect is now being remedied wherever feasible.

There was a great improvement in 1877–78 as compared with 1876–77. The drought of the latter year taught the people a lesson; and during 1877–78, when a second drought threatened, they came forward much more

readily, and the area irrigated during the kharif season increased 50 per cent. Towards the end of the kharif season prospects improved, and the rabi season was much more favourable than the previous year; notwithstanding this, the area of rabi irrigation was 15 per cent. greater than in 1876-77.

Taking the whole works together, the area irrigated in 1877-78, *vide* statement II., was 35,331 acres; and on Colonel Baird Smith's axiom,* that if one-third of the cultivated area is provided with the means of irrigation "it is practicable to ward off famine even under the "severest form of drought of which we have yet had "experience," the area protected during 1877-78 was 105,993 acres. The culturable area under command was 215,981 acres. These areas are comprised in isolated patches throughout the Deccan and Guzerat. The aggregate gross areas of these districts are—

| | Acres. |
|---|---|
| Guzerat - - | 4,656,777 |
| Deccan - - - | 23,871,235 |
| Total - - | 28,528,012 |

or say, 29 millions, of which 14½ millions are cultivated.

(3.) The possibility of extending irrigation still further.
(*a.*)—By the improvement of existing works.
(*b.*)—By the creation of new works.

This enquiry embraces a very wide field. It can, however, only be usefully dealt with so far as actual investigation has shown works to be economically feasible. It is perhaps unnecessary to go beyond the limit of the ten years' programme (copy attached) prepared by this Government and submitted to the Government of India in June last. This indicates the principal schemes and their locality, which could, with advantage, be undertaken within a reasonable period.

The five years' forecast recently prepared and submitted (copy attached) gives complete information in respect of all schemes which have been completely worked out, and affords an answer to the queries embraced under para. 5 of the memo.

Statements III (*a.*), III (*b.*), and III (*c.*) attached give the information in regard to areas under command, irrigable, and protected by—

(*a.*) Works already completed or nearly completed—not included in the five-year Forecast.
(*b.*) Works already commenced and provided for in the five-year Forecast.
(*c.*) Works proposed and which have been completely worked out—included in the five-year Forecast.

Remarks have been added, showing briefly the state of the works at present.

Statement IV. recapitulates the information comprised in Statements I., III (*a.*), III (*b.*), and III (*c.*). It shows for each collectorate the area irrigable and protected by—

(1.) Wells, small tanks, and weirs across rivers and rivulets.
(2.) Works already completed or nearly completed.
(3.) Works already commenced.
(4.) Works proposed and which have been completely worked out.

In the case of wells, small tanks, and weirs, the area protected has been taken at three times the area irrigated, as arrived at in Statement I. The protection in this instance is only partial, for this means of irrigation is always liable to fail in seasons of drought. The area shown as irrigated, moreover, probably shows that *assessed* as irrigated, and which, though cultivated, may not actually have been irrigated during the year. In the other cases the area protected has been taken as the culturable area under command, except in those cases in which tha area commanded is more than three times the area the water will suffice for annually where that limit has been adopted. In this case the protection is, or will be, when the works are finished, complete, because the works either draw their supply from the the Western Ghâts or the supply is insured by storage.

This statement is designed specially to meet the requirements of para. 4, clause 3, of the memo.

The Konkan may at once be disregarded as a region of heavy rain-fall, in which protection from famine is not required, and accordingly no works are provided for.

Guzerat is dependent on the monsoon, and works of irrigation, besides affording protection from drought, give the promise of unusually favourable financial results; partly because the facilities for works from large rivers carrying considerable volumes throughout the dry season are great; and partly because the population is frugal and industrious, and better off than the ryots of the Deccan. The statistics of existing irrigation in Guzerat are incomplete for the reasons explained in Statement No. I. The total area of Guzerat may be taken as five millions of acres, of which 2½ millions are cultivated. The whole of this area would benefit by and will repay protection. The area protected by canals, &c., completed or nearly completed, is 42,516 acres; and by canals, &c., proposed and completely worked out 397,776 acres.

The whole of the Bombay Deccan, except the portions of the Khándesh, Násik, Ahmednagar, Poona, Sátára, Belgaum and Dhárwár Collectorates, adjoining the western ghâts, is liable to famine. Very many districts suffer periodically from severe drought, although a general famine, such as occurred in 1876-77, is unusual. Several of the existing new irrigation works owe their origin to the necessity for affording relief to distressed labour. Thus the Ojhar canal in Ahmednagar, the Kasurdi tank in Poona, the Gondowli and Chikhli canals in Sátára, were commenced at different times previous to 1876 as relief works. The Mukti reservoir (Lower Pánjhra irrigation) in Khandesh, and the Lakh canal and Bhatodi tank in Ahmednagar, were similarly also used for employment of relief labour in periods of scarcity previous to 1876.

The statistics in regard to irrigation in the Deccan are complete. The statements show the total area of nine collectorates as 24 millions, of which 12 million acres are cultivated. Of the cultivated area, probably, at least 9 millions stand urgently in need of protection.

At present:—

| | |
|---|---|
| 1,161,933 | Acres are partially protected by tanks, wells, &c. |
| 89,940 | Acres are protected by new canals and tanks completed or nearly completed. |
| 734,945 | Acres will be protected when other works already commenced are completed. |
| 99,113 | Acres will be protected by other proposed works. |
| Total - 2,085,931 | Acres, or say, 2 millions of acres out of a total of 9 millions requiring protection. |

Poona, 31st December 1878.

* Report on Famine, 1860-61.

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## Scheme of Irrigation Works for the Bombay Presidency.

*Minute by the Governor of Bombay, dated 16th May 1878.*

By Minute dated the 9th April 1878 I stated, with the concurrence of my honourable colleagues, the measures proposed by the Government of Bombay for providing the financial means of executing works for the prevention of famine.

By Minute dated the 13th May 1878 I laid before my colleagues the scheme of provincial State railways on the metre gauge to be constructed in 10 years.

I have now to propose for the consideration of my colleagues the outline of a scheme of irrigation works to be constructed in 10 years.

2. In my Minute of the 24th December 1877 on the recent famine the following statement was included of irrigation works with which progress had been made during the relief operations in the Deccan districts:—

"29. It was fortunate, even providential, that the Government possessed, almost quite ready and complete, prepared previously under orders of Colonel Fife, R.E., plans and estimates of many projects for irrigation, especially in the districts of Poona, Sholapur, and Satara. To several of these, accordingly, many thousands of relief labourers were drafted. Some idea of

this large operation will be afforded by the following table:—

| Name of District. | Name of Canal or Tank. | Highest number of Relief Labourers employed on it. | Approximate Area of tank, in acres. | Approximate Area under command, in acres. | Length of Canal or main channels, in miles. | Expenditure during the famine, in rupees. |
|---|---|---|---|---|---|---|
| Khandesh - | Mhaswa tank - | 670 | 421 | 2,000 | 6 | 58,000 |
| Ahmednagar | Ojhar canal extension - | 3,500 | — | 17,328 | 9 | 51,000 |
| Poona - | Mutha canal - | 18,155 | 3,681 | 105,812 | 76 | 2,51,000 |
| | Nira canal - | 16,780 | — | 270,680 | 129 | 5,94,000 |
| | Matoba tank - | 6,429 | 477 | 12,412 | 20 | 1,73,000 |
| | Shirsophal tank | 5,944 | 854 | 10,000 | 15 | 1,16,000 |
| | Bhadalwadi tank | 986 | 356 | 2,000 | 15 | 7,000 |
| Sholapur | Ashti tank - | 17,179 | 2,677 | 13,324 | 28 | 3,22,000 |
| | Paramon tank - | 9,943 | 6,702 | 60,000 | 60 | 1,54,000 |
| | Nehr tank - | 16,836 | 675 | 12,800 | 17 | 2,92,000 |
| Satara - | Mhaswad tank | 15,651 | 4,014 | 90,000 | 31 | 4,06,000 |
| | Pimli tank - | 10,574 | 349 | 4,100 | 11 | 2,76,000 |
| Belgaum - | Gokak canal - | 11,946 | — | 77,319 | 52 | 2,17,000 |
| | Gaddikeri tank | 1,251 | 156 | 450 | 2 | 18,000 |
| Dharwar - | Dambal tank - | 1,897 | 421 | 1,700 | 2 | 57,000 |
| | Mediери tank - | 1,129 | 109 | 1,916 | 16 | 26,000 |
| | Hirekerur tank | 1,001 | 567 | 562 | 2 | 18,000 |
| | Ranibennur tank | 908 | 208 | 174 | 2 | 24,000 |
| | Total - | — | 21,727 | 692,827 | 502 | 28,00,000 |

"30. The total area of all the tanks may be set down at about 21,727 acres; the total length of the canals and main channels at about 502 miles; and the total extent of lands irrigable at about 692,827 acres. The works, however, are not complete, though they may be described as being in various stages of completion. Even in their present state, however, a few of them will afford some useful irrigation. The total expense incurred during the famine on these irrigation works may be set down at Rs. 28,00,000, or 280,000*l.*; and the expenditure required to complete them may be estimated at about Rs. 63,00,000, or 630,000*l.* The means of providing the money hereafter for such completion is being separately considered in connexion with our provincial finance.

"31. Besides these there were several projects for irrigation; some inchoate, others more advanced, in the Southern Maratha Country.

"32. In the sketch map attached to this Minute will be found the various projects of irrigation, some actually undertaken, others designed with a view to being undertaken if the famine should last. From that it will be seen how large a foundation has been laid by the relief operations for the protection of the country by means of irrigation against famine in future. Upon this the question will at once arise as to how far these irrigation works of the Deccan could be relied on to supply water in event of a general drought occurring; and how far they are independent of the vicissitudes of the 'moonsoons' or periodical rains? Now, they are not so independent in the sense in which the canals of Northern India are, which draw their supplies partly from the regions of perpetual snow. But the Deccan canals are derived from rivers rising in the Western Ghaut mountains, where the rainfall never fails even when drought reigns elsewhere. The large tanks will fill after the ordinary rains of one year, and will hold a supply of water enough for two years. Thus they would bear one year's drought quite well, would hold out even through a second year of drought, and would become empty only during the third year of continuous drought. Thus they would fail only in the event of three years' continuous draught—an event possible, indeed, but of very rare occurrence, and beyond the range of ordinary misfortune. But if they bear drought for the first year quite well, and for the second year tolerably well, they would afford a considerable protection to the country against moderate calamities of unhappily frequent occurrence."

3. Besides these works, which are in the Deccan districts, other works have been designed, for some of which the projects have been prepared, while for others the plans and estimates have yet to be completed.

4. In the Guzerat province, too, some projects have been brought forward—some new, others of older date.

5. In the list now to be presented the canals of Sind have not been included; as in that province the irrigation system is on a somewhat different footing as compared with the other parts of the Bombay Presidency, and I need not now trouble my colleagues with any remarks thereon; having said what I have to say in my Minute of the 25th September 1877.

6. The subjoined abstract statement, then, as prepared under our directions by our Officiating Secretary, Colonel C. J. Merriman, R.E., in communication with the Chief Engineer for Irrigation, includes the whole of the Bombay Presidency, excepting Sind, and relates mainly to the districts of the Deccan, and of Guzerat.

7. By this scheme this Presidency would have, within 10 years, in its Deccan and Guzerat districts, at least 50 more irrigation works, with an area of lakes or tanks of 79,779 acres or 125 square miles, with a length of canals or main channels of 1,916 miles, with an irrigable area of 2,041,526 acres or 3,190 square miles, at a cost of 504½ lakhs of rupees or 5,045,000*l.*, of which sum 100½ lakhs or 1,005,000*l.* have been already spent. These figures are approximate only in the totals; but many of the factors which make up the totals have been accurately ascertained.

8. The population of the Deccan and Guzerat districts concerned may be set down at 10½ millions of souls and the land revenue at 230 lakhs of rupees per annum. The protection afforded to these great interests by the above scheme of irrigation works is too manifest to need description. If in time of drought the produce due to two millions of acres under command were secured by irrigation that would give a food supply to the resident population for a considerable time.

9. It will be, doubtless, satisfactory to my colleagues to observe that in the Deccan districts particularly—that is, those districts most exposed to drought and scarcity—the irrigation works are spread almost evenly—that is to say, each district has a fair proportion of such works, and hardly any part of the country will be left without them.

10. Exclusive of Sind, the Bombay Presidency has now about 10½ lakhs of rupees a year from the extraordinary and ordinary financial grants (made by the Government of India) available for irrigation. Out of this sum about 3 lakhs have to be devoted from ordinary funds to repairs and maintenance of existing works; and the remainder, or about 7½ lakhs, can be devoted to new works, including establishment and tools and plant for the same. The last named sum would not, of course, suffice for the execution of the works within 10 years. For such a purpose about 40 lakhs a year would be needed. This amount, of course, could be provided, not from ordinary revenue, but only from borrowed funds, the interest on which must be guaranteed by the Provincial Government of Bombay. The special rate which we have already proposed to levy for works for the prevention of famine will defray the interest on outlay while the works are under construction. Then a water advantage rate would be levied on the irrigable area after the works shall have been finished and shall have begun to supply water for irrigation. On the irrigable area shown above a light water advantage rate would suffice; say eight annas an acre, and a lighter rate than that can hardly be proposed. Even that would yield 10 lakhs on the irrigable area of 2 millions of acres, which would be enough, together with the other available resources.

11. Some expansion of our hydraulic engineering establishments would be needed. But there would be no difficulty whatever in this respect whenever the outlay shall have been arranged.

## BERAR.

*Reference—"Irrigation as a Protection against Famine."*

By the SECRETARY, P.W.D., to the RESIDENT, Hyderabad.

1. *Point* 1. *Area irrigated.*

The following figures will show the extremely small portion of the area of Berar that is actually irrigated :—

| | | |
|---|---|---|
| Total area | - - - | 10,800,526 acres. |
| Cultivated | - - - - | 5,909,089 ,, |
| Barren | - - - | 3,051,502 ,, |
| Cultivable, not cultivated | - | 1,839,935 ,, |
| Total amount cultivable | - | 7,749,024 ,, |
| Actual area irrigated in 1876–77 | | 51,372 ,, |

or less than 3 per cent. of the total cultivable area.

2. Of this small quantity nearly the whole has been irrigated from wells, canals only supplying water for 351 acres and tanks for 163 acres; even the whole amount of water available from these sources has not been utilised, as in 1877 the land commanded by canals amounted to 520 acres and that from tanks to 1,801 acres; a tank has been completed this year that will, if required, irrigate another 1,075 acres. The total area irrigable is therefore 54,252 acres.

3. *Point* 2. *The extent to which such irrigation protects the crops.*

It may be asserted at once that no part of Berar is protected; the petty areas irrigated are, with hardly an exception, gardens. The part of Berar most liable to drought is the Akote Talook, a large portion of which has nothing but salt water in the wells, and where the configuration of the country will only admit of very small schemes for water supply for men and cattle.

4. *Point* 3. *The possibility of extending irrigation works.*

To properly consider this point, we must begin by examining the sources of water supply of the province both as regards the feasibility of constructing canals and tanks.

5. First, canals. There are no rivers in Berar which give a perennial supply sufficient to lead into canals for irrigation works. The largest river flowing through the province is the Poorna, an affluent of the Tapti. Although considered a perennial stream inasmuch as in ordinary seasons a thin rill of water trickles down the bed throughout the hot season, yet it is not so in an irrigation sense, and no valuable supply can be obtained from it for a perennial canal. The other main streams, viz., the Paingunga, Kati Purna, &c. are the same. The Wurda is perennial, but, as it forms the eastern boundary of Berar, is not of much consequence to the province.

6. There remains then the question of tanks.

Tanks formed by damming up any of the larger rivers appear impracticable on account of the cost. The channels run in deep valleys 30 to 60 feet below the level of the surrounding country, the slopes of the rivers are so great that the amount of water stored would be very small in comparison with the cost, and the amount of land that could be protected by each would be so trifling that in all probability the whole land revenue would not pay the interest on cost of construction.

7. The primary affluents of these rivers are, as might be expected, worse, inasmuch that the slopes of their beds are greater and the water under command much less, and they are very liable to be silted up.

8. There remain therefore the minor projects of damming across small streams near hills, where at a comparatively small cost a certain amount of water can be stored.

9. A large number of old native tanks exist in Berar, and hitherto the only work attempted has been to restore them. They all failed originally because proper arrangements had not been made to provide for the escape of flood water, showing that the native engineers in Berar were not so skilful as those in Southern India, where this subject was carefully considered. The following tanks have been restored; the amount of land they are capable of irrigating is shown in each case, but it is necessary to bear in mind that this only lasts until March as a rule, the storage not being sufficient to supply water throughout the hot season :—

| | Cost. Rs. | Area it can irrigate. |
|---|---|---|
| Futtehkhelda - - | 7,400 | 50 acres. |
| Rissod - - - - | 16,416 | 500 ,, |
| Ambona, just completed | 12,000 | 1,075 ,, |
| Karinja - - - | 15,000 | 400 ,, |

As before noted, even this supply is not fully utilized, the fact being that even in seasons of drought the Berar black soil is so retentive of moisture as to render the cultivators quite indifferent to water for ordinary crops.

10. The matter of irrigation has not been lost sight of in Berar. Ever since 1870 there has been an officer of the Public Works Department specially employed in surveying and examining projects which were considered at first likely to prove remunerative.

11. The following schemes were estimated in detail :—

1. Irrigation canal from the Morna river at Akola, estimated cost Rupees 4 lakhs, area irrigated 4,000 acres, besides monsoon irrigation.
2. Monsoon irrigation canal from the Nulgunga river, estimated cost 1¼ lakhs, area irrigated about 2,500 acres.

These schemes were both abandoned as unlikely to be remunerative.

12. Preliminary surveys were made of canals from the following rivers, and the projects abandoned as hopeless :—

1. The Kati Purna at Donad; the Mun River at Jogulkhera; a stream in the Akote District at Rumbapore; besides these, numerous other sites were examined and condemned.

13. Estimates were made for large tanks at—1, Khumgaon; 2, Rissod; 3, Wagdeo; 4, Koondala: they were all condemned as not likely to prove remunerative. The first three would have supplied perennial irrigation to small tracts of country, but the demand for water is so trifling as to render them quite out of the question as remunerative projects.

14. It is generally acknowledged now by the Civil Officers of Berar that any general irrigation schemes are unnecessary; at the same time it is quite possible that in case of a real famine occurring, and the necessity arising for relief works, some of these tanks might be undertaken as useful works and capable of giving employment to many labourers.

15. The real water want of Berar is for drinking. Many large tracts of country are extremely arid, and water from wells either salt or not procurable at all owing to the geological formation of the country (basalt rock being close to the surface and no springs obtainable by well sinking). The distress both for men and cattle is great, and water supply tanks in these localities are of inestimable value. Hitherto, however, these have only been constructed from village contributions assisted by grants-in-aid, and this system makes their universal extension impossible.

Bolarum, 20th November 1878.

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REMARK by W. B. JONES, Esq., Commissioner of the Hyderabad Assigned Districts.

Although the figures adopted by the Secretary, Public Works Department, do not appear to be quite correct, I regard the note generally as a perfectly correct representation of the circumstances of Berar in respect to irrigation, and consider therefore that it may well be laid before the Famine Commission. In Berar we have no irrigation except where garden crops are cultivated. Less than ½ per cent. of the land under cultivation is under rice, and even this crop is as a rule only cultivated when the nature of the ground produces a natural swamp, and in years when the rainfall is copious.

# MYSORE.

## *Irrigation as a Protection against Famine.*

By Lieut.-Colonel W. R. Johnson, Superintending Engineer for Irrigation.

*Paragraph 3 of Famine Commission Memorandum.*

1. The statement* called for has been compiled in the General Department. It shows that there are 520,705 acres under wet cultivation from different sources, out of 5,530,015 under crop in 1876–77. A separate statement (B) shows the details of the canal irrigation under the Irrigation Department.

2. As regards the parts of the province that are least irrigated, and most in need of water, the Chitaldrug district is that most subject to drought in the Mysore province, but is very fairly supplied with rain-fed tanks. Some remarks as regards utilisation of the rainfall will be found lower down.

3. With the object of distinguishing between the permanent sources of supply and those liable to suffer from drought, it will be convenient to divide the irrigation works in Mysore into three classes: 1stly, rain-fed tanks; 2ndly, river-fed tanks (by which is meant tanks fed by rivers rising in the Mulnaad, and capable of affording an ample supply, even with a scanty rainfall); 3rdly, river-fed channels.

3. The first class, or rain-fed tanks, cannot be considered a permanent source of supply, as they afford very little protection in cases of protracted drought. Such cases are fortunately, however, rare in Mysore, and the value of these tanks in periods of scarcity of short duration, as well as in seasons of plenty, can hardly be overestimated. They maintain the spring level in the sub-soil to a much higher level, and to a much longer period, than would be the case if they had no existence; and, even when they may receive little or no supply, their beds retain sufficient moisture to allow of their being then cultivated, and of very valuable crops being matured. So valuable are the crops raised, for a few seasons, in the beds of some tanks, that it is not an uncommon thing for a tank to be breached in order that its bed may be cultivated; and as the area of the bed is frequently equal to that of the land below, the crops realised are, owing to the richness of the soil, &c., of far greater value.

5. The other two classes may be considered permanent sources of supply: they consist principally of the channels and tanks drawn and fed from the Cauvery, Hemavaty, and other large rivers. A statement (B) of the works under the Irrigation Department is appended. Some of the sources of irrigation in the Mulnaad may also be considered permanent; but no statistics are available from which any complete statement can be prepared.

*Paragraph 4.*

6. As regards the areas requiring protection by means of irrigation, and what areas are actually so protected, it may be observed that Mysore is exceedingly well provided with irrigation-works, though many of them are very much out of order; but, valuable as these works are, they cannot be considered as protecting *completely* any portion of the province from the effects of drought; the more these works are extended and improved, the greater will be the protection they afford; but it is not to be looked for that any expenditure within reasonable limits will *completely* protect the country in time of continued drought.

7. In considering this question, it will be as well to bear in mind that the people of the province subsist principally on dry grains; and that, with the exception of a few localities, they are not willing considerably to extend their wet cultivation. Their dry crops give them the food they require. They raise them with much less trouble and expenditure of capital than wet crops; and they are not sufficiently enterprising to go in for a more remunerative description of cultivation. Any very elaborate extension of the present system of irrigation in Mysore is not likely to prove remunerative.

*Paragraph 5.*

8. Two statements† are appended which show the irrigation schemes which have been prepared, or are under preparation, and give the other details required: the one deals with rain-fed tanks, the other with river-fed channels.

9. A very complete scheme for the improvement of the tanks was set on foot in 1872, since which 953 tanks have been dealt with at an expenditure of Rs. 11,34,807. The scheme, as started, was somewhat too comprehensive for districts in which the tanks were very numerous and of small size, and in such districts required some modification. In addition to this, such improvements as were most desirable could not in many cases be carried out, owing to the vested interests of the proprietors of other tanks above and below. Notwithstanding this, however, a vast amount of good has been effected, the benefits from which, during the late famine, were sufficiently apparent. The amount of activity displayed, and the results achieved below these tanks, when the rain did fall and the tanks filled, were a source of sincere gratification to all who had waited for it so long. I append an abstract statement (E) of the tanks in the province, so far as the returns available allow of being supplied. The scheme has been abandoned by the Local Government, with the approval of the Government of India, as being beyond the reduced means of the province.

10. One scheme may be here specially mentioned, the "Maury Canway" reservoir in the Chitaldrug district. The proposal is to construct a bund across the Huggry river in a narrow pass called the "Maury Canway," and store 15,000 millions* of cubic feet of water, which it is estimated would irrigate 30,000 acres of land. The probable cost is put down at 23 lakhs.

11. This is no doubt a grand scheme; and there are no insurmountable engineering difficulties in the way of its being successfully carried out. The result of the work hitherto carried out in Chitaldrug has not been such as to encourage the prosecution of so large a work. Although this district suffers more from drought than any other in Mysore, the ryots, as a rule, do not appear to be eager to extend their wet cultivation. Rather than do this, they frequently breach the tanks, in order to cultivate the beds with dry crops; and the district is thickly studded with so-called "sagwally cuttays," which arrest the surface-drainage at every available place, and keep it out of the reservoirs constructed to receive it. The drainage thus held back is wasted by evaporation and infiltration, and results in the cultivation of a fraction of an acre of jowari, wheat, or other semi-wet crop.

12. One notable exception to the above are the ryots of Mulcalmuru in the north of Chitaldrug. A number of dams across the Chinna Huggry lift the floods into channels which feed numerous tanks, the land below which is very valuable, and is highly cultivated. Much has been done under the tank scheme for the improvement of these valuable works, which are now all but completed. Whether, with the certainty of a supply, such as would be yielded by the Maury Canway, more enterprising ryots would not be attracted, and the water fully utilised in time, is, I think, quite within the bounds of probability; but hitherto the results of irrigation expenditure in Chitaldrug have not been encouraging.

10. Another (smaller) work has been proposed, but has not yet been fully projected; it consists of an anicut to be thrown across the Chinna Huggry, well above the anicuts alluded to in paragraph 12, and to supply several very fine tanks when the river is in flood. This is a very promising project, and would not, probably, cost more than three lakhs; it is called the Rekulgerry project.

14. It may be as well to mention the two enormous reservoirs proposed by the "Irrigation and Canal Company," namely, the "Luckwally" and "Muddluck Masoor," which were intended to supplement the supply in the Toongabudra in dry weather, but which are not required for the purposes of irrigation in Mysore.

15. As regards the channels, statement (C) shows that the estimates already sanctioned amount to Rs. 9,07,431, of which Rs. 8,07,468 have been expended. None of the improvements are yet completed; but the result of the work done is already beginning to be felt; the revenue realised in 1877–78, Rs. 1,95,442, being Rs. 27,377 more than it was in 1866–67. As the improvements are completed, the increase will, of course, be more considerable.

* Marked A.

† C and D.

* *Sic* in original.

16. The extent to which these channels can be improved, so far as direct cultivation from them is concerned, is limited by the minimum supply in the river during the cultivation season, say in December. Only so much land can be brought under irrigation as there is then sufficient water in the river to irrigate; and, whatever may be the capacity of the floods, say, in July, irrigation *direct* from the channels must be limited to the supply available in December.

17. Heretofore it has been usual to keep the channels closed for about six months in the year; but, when the improvements are completed, water will (with a short recess for repairs) be kept in the channels the whole year round; and it is hoped that, at all events at the upper end of the channels, the ryots will then cultivate two crops, which will still further augment the utility and return from these valuable works. Difficulties are suggested as regards sufficiency of manure, &c., which I trust, will be got over.

18. Under any circumstances, however, it will be seen that the improvement of these works (which may be considered certain of a supply even in times of drought), so far as direct irrigation is concerned, is limited. There is, however, no reason why the flood-waters should not be utilised to a greater extent than is now done. Already many of the channels have reservoirs below them which are filled during floods, and mature crops beyond the reach of direct irrigation from the channels; and this system may be extended. Where the slope of the country and the river-bed is such as to cause the channel to hug the river-bank, much cannot be effected; but where the channel can be got well away, and, by a cut through a saddle, or otherwise, made to discharge into another water-shed, the number of tanks that could be supplied need only be limited by the area of the valley commanded, the extent of the reservoirs that could be constructed therein, and by the capacity of the channel; the supply in the river being practically unlimited: reservoirs thus fed would be certain of their supply.

19. As an example, the Hanagode channel, drawn from the Lutchmonteerth to the south-west of Hoonsoor, may be cited. The supply in the Lutchmonteerth river is very low in the dry weather—altogether insufficient for the land that might otherwise be irrigated. At 11¼ miles from the head, however, it crosses the water-shed and falls into the valley of the Cubbany. By increasing the capacity of the channel, and improving the reservoirs in the Cubbany valley, a large quantity of flood-water might be impounded that now flows uselessly to sea; and, if people could be found to take up the land, what is now an unhealthy tract of jungle of considerable extent might be turned into a smiling rice field.

20. Similarly, the Mundigherry channel, on the right bank of the Hemavaty river, might, by an easy cut through a ridge, be thrown into the water-shed of the Cauvery river, and fill reservoirs all down the Beria valley.

21. These are not large projects; they have been investigated, are known to be feasible, and would no doubt prove remunerative; and there is little doubt that further investigation will show that other and more extensive projects are possible. The finances of the province, however, and the ability of the ryots to extend their wet cultivation, render it unnecessary and undesirable to move too fast. There are already as many well-considered and projected schemes for these channels in hand (while others are being worked out) as we are likely to have funds to carry out. It would not be possible with any outlay to completely protect by irrigation the province from the effects of continued drought; but, as already stated, we are happily so seldom afflicted therewith that, although such a scheme is altogether beyond our powers, we may reasonably hope, for many years to come, to be spared such an experience as we have just passed through.

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## MADRAS.

### No. 55 I.

No. 30-A. *Note by the Acting Chief Engineer for Irrigation.*

The accompanying statements, showing the present areas and proposed extension of irrigation by projects dependent on permanent or local sources of supply in the Madras Presidency, accompanied by an index map, were forwarded direct to the Famine Commission on the 11th instant, in accordance with the proceedings of the Madras Government in Financial Department, No. 2,052, dated 19th November 1878.

2. These statements have been compiled from the records available in the Office of the Chief Engineer for Irrigation, and it is hoped will afford all the detailed information required by the Famine Commission, and asked for in their Secretary's letter No. 323 of the 4th November 1878. An opinion on the various matters of principle or theory involved in the present inquiry will no doubt have been expressed by the Irrigation Committee, of which Colonel Mullins, the Chief Engineer for Irrigation, was the President.

(Signed) J. O. Hasted, Lt.-Col., R.E.,
Trichendur, Acting Chief Engineer
21st February, 1879. for Irrigation.

To the Joint Secretary to Government,
Public Works Department,
Irrigation Branch.

## LIST A.

### MADRAS PRESIDENCY.

STATEMENT of Irrigation from Permanent Sources of Supply, showing the Present Areas and Proposed Extension of Irrigation by Projects.

| — | District. | Name of System or Source of Supply. | Projects. Name. | Projects. Amount of Estimate for Works only. | Probable Ultimate Cost of the Scheme, including Establishment Charges, &c. | Revenue dependent on Irrigation, 1875-76. | Estimated Return per 100. | Extent of Irrigation. Present, 1875-76. | Extent of Irrigation. Ultimate. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Rs. | Rs. | Rs. | Rs. | | | |
| A. Sanctioned by Government of India, and works in progress - B. Under revision. Will soon be submitted - C. Sanctioned by Government of India, and works in progress - | Godavari - | Godavari Delta System. | A. Eastern Delta completion | 12,99,934 | (a)167,01,936 | (b) 23,79,265 | — | (b) 5,24,137 | (a) 606,599 | Work in progress; three-fourths completed. Estimate under preparation. Work in progress; about three-fourths completed. Total expenditure of the Godavari Delta System up to 31st March 1878 was Rs. 79,21,119 (G.O., No. 880 I, dated 5th November 1878). (a) G.O., No. 18 I, dated 9th January 1879. (b.) G.O., No. 561, R. D., dated 9th April 1878. |
| | | | B. Central do. do - | (a)10,00,000 | | | | | | |
| | | | C. Western do. do. - | 13,30,038 | | | | | | |
| | | | Unforeseen works - - | (a)5,00,000 | | | | | | |
| D. Has never been investigated, and appears to have been merely suggested by Sir A. Cotton. | Godavari - | Godavari River | D. Polaveram Anicut (c) - | — | — | — | — | — | 2,00,000 | (c.) This project has not been investigated, and the probable area of irrigation has been roughly taken from the map. The late Colonel Anderson, when Chief Engineer for Irrigation, says regarding this scheme in his memorandum printed with G.O., No. 249, dated 27th January 1869:— "The construction of an anicut across the Godavari at "Polaveram, about 20 miles above Rajahmundry, was "advocated many years ago by Sir A. Cotton (I write from "memory and may be mistaken, as I have been unable to "trace a reference to this project in any of Sir A. Cotton's "reports in my possession); but the subsidiary channels "would necessarily be of a more expensive character than "those in the delta; and although the project is likely at "some future period to merit attention it cannot be seriously "thought of until the Delta System has been fully "completed." |
| E. and F. Completely investigated and partly submitted to Government of India - | Kistna - | Kistna Delta System - | E. Eastern Delta completion | (d)35,59,339 | (d)140,56,079 | (e) 10,85,763 | — | (e) 264,256 | (d) 470,000 | Estimates partly submitted to Government of India but not yet sanctioned (G.O., No. 3,528 A, dated 22nd December 1876). Do. do. G.O., Nos. 3,573, dated 19th December 1874; 344 I, dated 24th September 1877; 629 I, dated 12th August 1878. Total expenditure up to 31st March 1878, Rs. 48,56,509. G.O., No. 880 I, of 5th November 1878. (e.) G.O., No. 1,338, R. D., dated 26th August 1878. Do. do. (d.) Proceedings, Madras Government, No. 1 I, dated 9th January 1879. |
| | | | F. Western do. do. - | (d)30,06,405 | | | | | | |
| G. Already existing and included to make the statement complete H. Was investigated by the officers of the Madras Irrigation and Canal Company, and is one of those projects for which the Company have lately relinquished their claims to Government. It appears not to have been taken up by the Company as too expensive in its present form - | Bellary - | Tungabhadra River - | G. River channels - - | — | — | (f) 1,32,905 | — | (f) 14,028 | (f) 15,351 | (f.) Revenue Settlement Report of Bellary District for 1875-76. These are existing channels. This scheme was fully worked out and estimated for by the officers of the Madras Irrigation and Canal Company at the end of 1866, and is referred to in list I, accompanying Colonel Mullins' memorandum, No. 16 C, of 1st October 1877; also in G.O., No. 210, dated 28th November 1876. |
| | | | H. Channel from Walavapore to Bellary or Upper Bellary Project. | 81,46,250 | 143,88,000 | — | — | — | 150,000 | |
| K. Has been completed by the Canal Company, with the exception of navigation works, which are now in progress - | Kurnool - Cuddapah - | Do. - | K. Madras Irrigation and Canal Company's Canal - | — | 169,30,000 | 38,173<br>19,460 | —<br>— | 10,420<br>5,949 | 240,530 | Area irrigated by canal was in 1876-77 acres 96,372 (G.O., No. 776 I, dated 4th October 1878, Statement XIV). |

LIST A.—MADRAS PRESIDENCY.—Statement of Irrigation from Permanent Sources, &c.—*continued.*

| — | District. | Name of System or Source of Supply. | Projects. Name. | Projects. Amount of Estimate for Works only. | Probable Ultimate Cost of the Scheme, including Establishment Charges, &c. | Revenue dependent on Irrigation, 1875-76. | Estimated Return per 100. | Extent of Irrigation. Present, 1875-76. | Extent of Irrigation. Ultimate. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Rs. | Rs. | Rs. | Rs. | | | |
| L. Partly completed, but work stopped, pending submission of revised estimates | Nellore | Penner Anicut System | L. Penner Anicut extension | (g) 1,47,500 | — | (h) 2,12,331 | — | (h) 54,102 | (i) 77,000 | (g.) G.O., No. 1,738, dated 19th June 1875.<br>" " 1,134, " 8th May 1876.<br>" " 2,604, " 27th Sept. "<br>" " 3,455, " 16th Dec. "<br>The work on the Survapilly Project has been stopped pending submission of revised estimate, G.O., No. 3,180, dated 28th November 1876.<br>(h.) Revenue Department, G.O., No. 561, dated 9th April 1878.<br>(i.) G.O., No. 1,844, dated 20th June 1867.<br>Public Works Department, G.O., No. 14 I, 7th May 1877. Project fully matured, but nothing has been done as the work is not considered sufficiently remunerative.<br>The source of supply of these two Projects cannot be said to be permanent without the use of Tungabhadra water. |
| M. Fully investigated but not sanctioned by Government of India, as the estimated return of 4·28 per cent. on the total estimate, including indirect charges, was not considered sufficiently remunerative | | | Survapilly project | 5,50,000 | | | | | | |
| | | Penner | M. Sangam project | 24,33,805 | 31,76,050 exclusive of indirect charges, and 43,79,304 inclusive of indirect charges, such as interest, &c. | — | 4·28 on the total estimate including indirect charges. | — | 94,000 | |
| N. Was submitted to the Government of India in 1870, who deferred sanction pending a more complete demonstration of the capability of the Coleroon to carry the additional water to be diverted into it at the grand anicut | Tanjore | Cauvery Delta System | N. Upper Anicut Regulation of the Cauvery at Grand Anicut. | (j) 5,20,260 | (l) 28,18,810 | (k) 34,73,521 | — | (k) 788,612 | 898,133 | (j.) G.O., No. 2,116, dated 3rd September 1870.<br>(l.) Demi-official statement from the Chief Engineer for Irrigation to Colonel Brownlaw, dated 22nd February 1878.<br>(k.) Revenue Board's Proceedings, No. 3,005, dated 8th November 1878, and No. 3,440, dated 20th December 1878.<br>The proposed regulating and other unforeseen works are intended to secure existing revenue and prevent the necessity for remissions on account of floods, &c. |
| | | | Unforeseen works | (l) 5,00,000 | | (l) 4,13,806<br>1,55,989 | —<br>— | 71,282<br>38,239 | | |
| O. P. Q. R. S. T. Already existing and included to make the statement complete | South Arcot<br>Tanjore | Coleroon River | O. Lower Coleroon Anicut | — | — | | | | | |
| | Trichinopoly | Cauvery River | P. River channels | — | — | (m) 4,25,028 | — | (m) 79,785 | (m) 80,898 | (m.) Revenue Settlement Report of Trichinopoly District, for 1875-76. |
| | Salem | Do. | Q. Do. do. | — | — | — | — | — | — | There are a few acres in the Salem District directly irrigated from the Cauvery, but they are not included in any revenue return received. |
| | Coimbatore | Cauvery<br>Bhavani River<br>Noyel do. | R. River do<br>S. Do. do.<br>T. Do. do. | —<br>—<br>— | —<br>—<br>— | 38,221<br>2,17,783<br>75,120 | —<br>—<br>— | 5,318<br>27,054<br>16,277 | 5,459<br>28,202<br>19,328 | These returns have been taken from the Revenue Settlement Report for 1875-76. The ayacut areas have been taken as the ultimate areas. |
| U. Investigation not completed. Preliminary report has been submitted to the Chief Engineer for Irrigation. | Coimbatore and Salem. | Cauvery | U. Neringepett Anicut | — | — | — | — | — | (n) 20,000 | (n.) Nothing yet done. Colonel Anderson's report printed with G.O., No. 247, dated 27th January 1869. |
| V. Fully worked out and submitted to Government, who have not yet finally disposed of the project | Madura | Vaigai | V. Perryaur project | 53,13,000 | — | 88,549 | — | (a) 15,904 | 109,076 | Project fully worked out. (Public Works Department, G.O., No. 1 193, dated 30th April 1875.)<br>Do. G.O., No. 1,619, dated 27th June 1876, and Colonel Mullins' memorandum, No. 16-C, of 1st October 1877.<br>(a.) Present irrigation has been taken from the Revenue Settlement for 1875-76. |
| W. Nearly completed as far as estimates are sanctioned. Estimates for improvements to the South Main Channel have been submitted to the Government of India | Tinnevelly | Tambrapurni | W. Srivaikuntham Anicut | — | — | (b) 1,58,657 | — | (b 50,019 | (c) 32,000 | (b.) Revenue Department, G.O., No. 561, dated 9th April 1878.<br>(c.) Public Works Department, G.O., No. 3,366, dated 26th October 1868. |
| | | | X. River channels above Srivaikuntham Anicut. | — | — | 6,71,467 | — | 95,242 | 95,242 | |
| X. Already existing and included to make the statement complete | | Minor rivers | Y. River channels | — | — | 3,33,301 | — | 15,344 | 15,344 | |
| Y. Z. Already existing and included to make the statement complete. | Malabar | Direct rainfall | Z. Direct rain-fed irrigation | — | — | 11,66,250 | — | 388,309 | 388,309 | |
| | | | Total | — | — | 110,47,715 | — | 2,444,877 | 3,545,402 | |

Fort St. George, 13th February 1879.

## LIST B.

### MADRAS PRESIDENCY.

**Statement of Irrigation dependent on Local Rainfall, showing the present Area and proposed Extension of Irrigation by Projects.**

| —— | District. | Name of System or Source of Supply. | PROJECTS. No. | PROJECTS. Name. | PROJECTS. Amount of Estimate for Works only. | Probable ultimate Cost of the Scheme, including Establishment Charges. | Revenue dependent on Irrigation, 1875-76, (G.O. P.W.D.), No. 339 I., dated 22nd Sept. 1877. | Estimated Return per Cent. | Extent of Irrigation. Present, 1875-76. | Extent of Irrigation. Increase. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Has been fully investigated. Sanction postponed. | Ganjam - - | Rushikulya and Mahanadi Rivers. | 1 | Rushikulya project - | Rs. 19,07,414 | Rs. 29,01,500 | Rs. | 4 | | 120,000 | 1. The particulars of this project which has been fully worked out are given in the papers printed with G.O., No. 1, 93, dated 23rd May 1876. The further data connected with the water supply and sub-soil water called for are being collected. It is possible that in the future this project may assume a more certain aspect of profit, and this Government were of opinion that the time has not come for undertaking it. |
| 2. Estimates with Chief Engineer for Irrigation. | - - - | Korkay River - | 2 | Mailada Tampara - | 19,258 | 25,000 | | | | 2,016 | 2. G.O., Revenue Department, No. 355, dated 4th March 1875. The project provides for completing an anicut across the Korkay River, two miles above its junction with the Rushikulya, improving or constructing channels and embanking the Tampara or natural lagoon. A fairly promising scheme, postponed for want of funds. The revised plans and estimates called for in G.O., No. 400 I., dated 13th May 1878, have been received from the District Engineer, but not yet disposed of. |
| | | | | | | | 378,131 | 0 | 297,641 | | |
| 3. Partly investigated - - - | - - - | Vamsadhara River | 3 | Vamsadhara or Chicacole project. | 3,05,400 | 4,15,000 | | | | Not known. | 3. This project was partially investigated by Major Beckley in 1870. Until some definite understanding has been arrived at with the Zemindars and Proprietors holding lands under existing channels which would be absorbed by the project, the work cannot be sanctioned. Public Works Department G.O., No. 2,688, dated 15th November 1872; and Revenue (Famine) Department G.O., No. 706, dated 18th March 1878. |
| | | | | Irrigation from existing works. | | | | | | | |
| 4. Estimate for works have been prepared, but the estimate return has not been finally settled. | Vizagapatam - | Sarada - - | 4 | Krishnamraz Channel - | 27,700 | 37,000 | | | | Not known. | 4. This project provides for improving an anicut channel which supplies both Proprietary and Government lands. The estimates are given in Proceedings, Madras Government, No. 2,883, dated 1st October 1875. The area of irrigation interested is Government land - 2,163 Acres. Proprietary land - 2,440 ,, The Collector's report on the subject is contained in Proceedings, Madras Government, Public Works Department, No. 935 I., dated 19th November 1878, and is not favourable to the scheme. |
| | | | | | | | 299,088 | — | 166,676 | | |
| 5 to 8. Have been merely suggested. No investigations appear to have been made. | - - - | Do. - - | 5 | Kondakirla Ava project | *No information* - - | | | | | Do. | 5. The ava or lake was, it would seem, formed or enlarged by bunding its outlet, and it has been proposed to improve its supply and extend the irrigation under it, but the project has not been matured because the question as to the rights of Government in the ava or reservoir has not yet been finally determined. The Collector's opinion is not favorable to the scheme. |
| | - - - | Nagavolia River - | 6 | Nagavolia River project | Do. - - | | | | | Do. | 6. There is no information on record; most part of the area to be irrigated is Zemindari land. |
| | - - - | - - - | — | Irrigation from existing works. | — | — | | | | | |
| | Godavari - - | - - - | — | Do. do. - | — | — | 135,529 | — | 79,250 | | |

Statement of Irrigation dependent on Local Rainfall, showing the present Area and proposed Extension of Irrigation by Projects—*continued.*

| — | District. | Name of System or Source of Supply. | Projects. No. | Projects. Name. | Amount of Estimate for Works only. | Probable ultimate Cost of the Scheme, including Establishment Charges. | Revenue dependent on Irrigation, 1875-76, G.O. (P.W.D.), No. 339 I, dated 22nd Sept. 1877. | Estimated Return per Cent. | Extent of Irrigation. Present, 1875-76. | Extent of Irrigation. Increase. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Kistna | - - - | 7 | Dondapad tank - - | Rs. 22,000 | Rs. — | Rs. | | | Not known. | 7. The restoration of this old tank was pressed in 1867, and was soon after inspected by Colonel Winscom, R.E., who was impressed most favourably by it.—Proceedings, Madras Government, No. 1,184, dated 4th May 1870. |
| | - - - | - - - | 8 | Bollapilly tank - - | No information. | | | | | Do. | 8. "The site has not been examined professionally, but it can be safely affirmed that every acre available will be greedily taken up for wet cultivation should the tank be made. It lies in a part of the country where water is sorely needed."—Proceedings, Madras Government, No. 1,184, dated 4th May 1870. |
| | - - - | - - - | 9 | Vippurla tank - - | Do. | - - | | | | Do. | 9. "This is a promising scheme on a similar scale. Water is much wanted, and there is no reason to doubt that it would be freely taken if provided."—Proceedings, Madras Government, No. 1,184, dated 4th May 1870. |
| | - - - | Muneyar - - | 10 | Muneyar anicut scheme | 2,00,000 | — | | | | Do. | 10. "This was a project of the late Colonel Winscom, which was never matured. The Collector reports that 32,000 rupees increased revenue may be expected from a supposed expenditure of two lakhs. The cost is much underestimated. The Muneyar is not a perennial stream, and not fit to be relied on for channel irrigation; if anything is to be done with it, reservoirs must be constructed. No doubt water would be readily taken."—Proceedings, Madras Government, No. 1,184, dated 4th May 1870. |
| | - - - | Naguleru - - | 11 | Bunding Naguleru - | No information - - | | 102,406 | — | 14,068 | Do. | 11. "This is the proposed restoration of an ancient tank at Mellavagu in Vinukonda Taluk. The site was carefully inspected by Captain C. J. Smith, R.E. There is no doubt that water would be freely taken and that it is much wanted. The probable returns are shown at Rupees 27,000, but there is no estimate of cost; it is a work well worthy of the attention of Government."—Proceedings, Madras Government, No. 1,184, dated 4th May 1870. |
| 7 to 15. | Have been merely suggested. No investigations appear to have been made. | | | | | | | | | | |
| | - - - | Peddavagu - | 12 | Bunding Peddavagu and Yeddavagu. | Do. - - | | | | | Do. | 12. "This scheme has not been investigated professionally. The streams are not perennial, and without reservoirs no works will be of use. There is little doubt that water would be readily taken for irrigation if provided." |
| | Nellore - | - - | 13 | Restoring Adurapallai tank of Griddalore. | 15,000 | — | | | | Not known. | 13 & 14. "These tanks were of native construction, were breached a century or two since, and their restoration was suggested by the Collector in 1869.—Proceedings, Madras Government, dated 19th January 1869, No. 165. They are situated in the Rapur Taluk. The water-supply of the tank of Griddalore is said to be very good. No doubt want of adequate escapes led to the ruin of the tanks."—Chief Engineer for Irrigation's memorandum, No. 16-C, dated 1st October 1877. |
| | - - | - - - | 14 | Restoring Tirumalapady tank. | 20,000 | — | | | | — | |
| | - - | - - - | 15 | Restoring Gandipalem large tank. | 1,00,000 | — | 4,39,630 | — | 170,117 | 13,480 | 15. This is mentioned in the same Proceedings, Madras Government. A survey and estimate were, it appears, prepared in 1868 by the Public Works Department. It is said that this tank would irrigate 13,480 acres assessed at Rupees 1,20,000. Colonel Mullins' recollection is that the idea was given up because there was but little Government land commanded by it. There was a tradition that the tank was purposely breached during a siege of Udayagiri; and it is situated in the taluk of that name. |
| | | | | Irrigation from existing works. | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 16. Preliminary report received and investigation ordered. | Cuddapah | Sugglair | 16 | Sugglair project | Not known | | | | Not known. | 16. Mr. Unwin, Bengal Executive Engineer, examined this project and sent in a preliminary report; and detailed plans and estimates have been called for.—Chief Engineer for Irrigation's memorandum, No. 371 I, dated 31st December 1878. |
| | | | 17 | Talarycheruva Dyalla tank restoration. | Do. | | 7,15,389 | — | 220,856 | — 17. Investigation has been ordered, but nothing known as to what has been done.—Proceedings, Madras Government, No. 2,240, of 2nd September 1871, and No. 1,892, of 9th August 1872. |
| 17 and 18. Have been merely suggested. No investigations appear to have been made. | - - - | - - | | Anicut on Papadavy | — | — | | | | 13,480 — 18. No information. |
| | - - - | Papadavy | | Peddapasupula channel irrigation. | 23,240 | 34,860 | | | | — 19. Referred to in Proceedings, Madras Government, Revenue (Famine) Department, No. 1,653, dated 30th July 1878. |
| 19. Partly investigated, but not settled | - - - | Pennair | | Irrigation from existing works. | | | | | | |
| | | | | Restoring Venkatareddipolicm tank. | No information | | | 5 | | 1,000 — 20. The tank is described as a splendid one and is said to have breached at least a century ago owing to the absence of adequate surplus works, the weir being only 10 feet long and the catchment basin 15 square miles.—Proceedings, Madras Government, No. 2,050 (Revenue Department), dated 15th December 1876, and No. 962 A, dated 6th March 1877. |
| | Kurnool | | | | | | | | | |
| 20 to 22. Have been merely suggested. No investigations appear to have been made. | | | | Arveed tank restoration | Do. | | | | | Not known. — 21. This tank is referred to in the papers above quoted, but no particulars are there given. |
| | - - - | | | Kalavatala tank project | 50,000 | No information. | | 15¼ | | Do. — 22. The only information available is that contained in G.O., No. 2,240, of the 2nd September 1871, in which it is stated that the cost was estimated at Rupees 50,000, and the returns at 15¼ per cent.—G.O., No. 2,240, of 2nd September 1871. |
| | - - - | | | Duvulair project | No information | | | | | Do. — 23. The District Engineer states in his Unanswered Reference List for August 1877 that plans, sections, and estimates are under preparation. The scheme is for cutting a channel 3¾ miles in length, 9 feet bottom width, and side slopes 1½ to 1 from the Duvulair to the Dupaud tank. It is said that the part of the channel would have to be cut through rock; 74,000 cubic yards are the estimated quantity of excavation. |
| 23. Plans and estimates are under preparation. | - - - | Duvula | | | | | 2,25,519 | — | 44,317 | |
| | | | | Taikoor reservoir | Do. | | | | | Do. — 24. Partly investigated by the officers of the Madras Irrigation and Canal Company.—Proceedings, Madras Government, No. 2,322, of 23rd July 1866, and abandoned. |
| 24 and 25. Partly investigated by the officers of the Madras Irrigation and Canal Company, and abandoned by them. | - - - | Hindry | 25 | Dewanapully reservoir | Do. | | | | | Do. — 25. Abandoned owing to length of bund and importance of villages swamped. |
| | - - - | Do. | 24 | New tank south of Arveed tank. | Do. | | | | | Do. — 26. The site is said to be a good one.—Proceedings, Madras Government, No. 2,050, dated 15th December 1876. No particulars are there given. |
| | | | 27 | Garladinna tank | Do. | | | | | Do. — 27. No information. |
| 26 to 28. Have been merely suggested. No investigations appear to have been made. | - - - | - - | 28 | Other tank sites in Markapur Taluk. | Do. | | | | | Do. — 28. The taluk abounds in favourable sites for the formation of new tanks. Probably two good officers could be usefully employed. |
| | - - - | - - | | Irrigation from existing works. | | | | | | |
| | | | 29 | Bookachela project | 15,95,000 | 20,00,000 | | | | Do. — 29. Investigations completed in 1869, but the late Colonel Anderson entertained a very unfavourable opinion of the project.—Proceedings of the Madras Government, No. 307, dated 22nd February 1877, and previous Government Orders. |
| 29. Investigation completed; but the project is not yet considered a favourable one. | Bellary | Penner | | Potalacoonta tank project. | 16,000 | — | | | | Do. — 30. Investigation has been ordered. The project is referred to in Chief Engineer for Irrigation's memorandum, 16-C, dated 1st October 1877. |
| 30. Investigation has been ordered | - - - | - - | | apore reservoir at Huggry. | 20,00,000 | — | 5,43,834 | 6·14 | 149,004 | Do. — 31. Partly investigated by the officers of the Madras Irrigation and Canal Company.—Proceedings, Madras Government No. 2,322, of 23rd July 1866. |
| | - - - | Huggry | 31 | loopur project | 1,77,550 | — | | | | 534 — 32. Investigated by the officers of the Madras Irrigation and Canal Company, but the details will require revision.—G.O., No. 2,322, of 23rd July 1866. |
| 31 to 34. Partly investigated by the officers of the Madras Irrigation and Canal Company. Are among the projects for which the Company have lately relinquished their claims to Government. | - - - | Penner | 32 | Hin project | 1,03,220 | — | | 8·82 | | 1,344 — 33. Do. do. |
| | - - - | Do. | 33 | adroor | No information | | | | | Not known. — 34. No particulars are on record. |
| | - - - | Huggry | 34 | Roddu from existing | | | | | | |
| | | | | Huggry irrigation unveram river Irrigation works. | 3,00,000 | — | | | | Do. — 35. Investigations commenced in 1869-70, but it appearing that the water supply was precarious and none of the projects proposed remunerative the schemes were laid aside until some officer might be available to see whether any modifications of Mr. Bell's proposals or any alternative arrangements were feasible. Referred to by the Chief Engineer for Irrigation in his memorandum, No. 16-C, of 1st October 1877. |
| 35. Partly investigated and postponed for want of officers. | Chingleput | Narnaveram river | 35 | Improving der Narna | | | 8,69,016 | — | 352,603 | |
| | | | | nicut | No information | | | | | Do. — 36. Survey of about 16 out of 18¼ miles of the proposed line of channel completed. |
| | | | | xisting | | | | | | |
| 36. Under investigation | - - - | Cortiliar river | 36 | Channel fro at Tamarapa Irrigation from works. | | | | | | |

Statement of Irrigation dependent on Local Rainfall, showing the present Area and proposed Extension of Irrigation by Projects—*continued*.

| — | District. | Name of System or Source of Supply. | PROJECTS. No. | PROJECTS. Name. | PROJECTS. Amount of Estimate for Works only. | PROJECTS. Probable ultimate Cost of the Scheme, including Establishment Charges. | Revenue dependent on Irrigation, 1875-76, G.O. (P.W.D.), No. 339 I, dated 22nd Sept. 1877. | Estimated Return per Cent. | EXTENT OF IRRIGATION. Present, 1875-76. | EXTENT OF IRRIGATION. Increase. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Rs. | Rs. | Rs. | | | | |
| 37. Investigations nearly completed, and work partly carried out as famine relief. | North Arcot - | Palar - - | 37 | Improving channel tion. | | | | | | | |
| 38. Was reported on some years ago, but not investigated for want of officers. | - - - | - - - | 38 | Mam Palar river s, North Sec- | 2,95,526 | — | | | | Not known. | 37. Investigation partly completed; most part of the work was carried out for famine relief. Estimates sanctioned in Proceedings, Madras Government, Revenue (Famine) Department, No. 1,995, dated 20th September 1878. |
| 39 and 40. Have been merely suggested. No investigations appear to have been made. | - - - | Cheyair - - | 39 | Ch baukam project - | No information - - | | 11,37,863 | — | 262,898 | Do. | 38. No information. |
| | South Arcot - | - - - | 40 | yair river - - eyair irrigation - cation from existing orks. | Do. - - Do. - - | | | | | Do. | 39. Do. do. |
| 41. Partly investigated - - - | - - - | Trimanecmoota-nudy. | | Arthur project - - | Do. - - | | | | | Do. | 40. Investigations deferred until requisite time and attention could be diverted to new projects. Referred to by Chief Engineer for Irrigation in memorandum, No. 16-C, dated 1st October 1877. |
| 42. Completely investigated, but not considered remunerative. | Salem - - | Kurumbapillay | 41 | Pullagacherry channel project. Irrigation from existing works. | 60,000 | — | 12,73,490 | — | 318,132 | Do. | 41. Partly investigated. Do. do., Proceedings, Madras Government, No. 2,416, dated 2nd October 1873. |
| | - - - | - - | 42 | Badataloo project - | 1,13,018 | — | | | | — | 42. Completely investigated, but not considered likely to be remunerative.—Proceedings, Madras Government, No. 417, dated 6th February 1877. |
| 43 to 45. Have been commenced as famine relief works. Detailed estimates are under preparation. | - - - | Sunnath - river. | 43 | Pennacondapuram tank project. | — | 60,713 | | | | 2,200 | 43. The work has been commenced and nearly completed for famine relief, but detailed estimates have not yet been sanctioned, Chief Engineer for Irrigation's memorandum, No. 38 I, dated 7th February 1879. |
| | - - - | Pooniar | 44 | Marandahully project - | — | 2,32,400 | | | | Not known. | 44. The work has been commenced for famine relief and approximate estimates sanctioned in Proceedings, Madras Government, No. 345 I, of 24th September 1877. Memorandum from Chief Engineer for Irrigation, No. 38 I, dated 7th February 1879. |
| | | | | | | | 4,82,414 | — | 105,703 | | |
| 46. Not considered advisable - - | - - - | - | | Baroor channel - - | — | 2,40,000 | | | | — | 45. The work has been commenced for famine, but detailed estimates have not yet been sanctioned. Memorandum from Chief Engineer for Irrigation, No. 38 I, dated 7th February 1879. |
| 47. Has been commenced as a famine relief work. Detailed estimates under preparation. | Coimbatore - | Cauver | | Malapady tank restoration. Irrigation from existing works. | 1,00,000 | — | | | | Not known. | 46. The restoration is not considered advisable. |
| 48. Has been merely suggested. No investigations appear to have been made. | - - - | Bhavan | | Improvement and extension of the Pogalore channel. | 1,07,500 | — | | | | Not known. | 47. A great portion of this work has been carried out for famine relief. Rough estimate sanctioned in Proceedings, Madras Government Revenue (Famine) Department, No. 1,915-A, dated 7th September 1878. |
| | Tanjore - - | - - | | Channel from Bhavani to the Noyal. Irrigation from existing works. | No information - | | 231,233 | — | 54,734 | Do. | 48. The scheme is said to be feasible, but not yet investigated. |
| 49. Estimates with Chief Engineer for Irrigation. | Trichinopoly - | Cauvery | | Irrigation from existing works. | — | — | 83,465 | — | 117,722 | — | |
| 50. Estimates are under revision - | - - - | - - | | Vengur channel project | 13,920 | — | | | | Not known. | 49. Estimates have been received, but not yet disposed of. |
| | Madura - - | - - | | Koduntherny tank project. Irrigation from existing works. | 15,000 | — | 354,657 | — | 126,591 | — | 50. The estimates are under revision. |
| 51. Arrangements have been decided upon, and the estimates are under preparation. | Tinnevelly - - | - - | | Irrigation from existing works. | — | — | 566,997 | — | 166,253 | — | |
| | Nilgiris - - | - - | | Marudur channel improvements. Irrigation from existing works. | 50,000 | — | 337,167 | — | 64,289 | Not known. | 51. The arrangements have been decided upon and the estimates are probably nearly ready. |
| | | | | Irrigation from existing works. | — | — | 90 | — | 40 | — | |
| | | | | Total - | — | — | 8,315,917 | — | 2,710,989 | — | |

Fort St. George, 13th February 1879.

(Signed) J. O. HASTED, Lt.-Col., R.E.,
Ag. Chief Engineer for Irrigation.

## LIST C.

### MADRAS PRESIDENCY.

### List of Projects for the Storage and Regulation of Flood Waters.

| — | District. | River. | Project. No. | Project. Work. | Drainage Area in Square Miles. | Capacity in Millions Cubic Feet. | Water stored in Millions Cubic Feet. | Estimated Cost. Project. | Estimated Cost. Water stored per Million Cubic Feet. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| I. to VI. Were proposed in connexion with the Rooskodia project, but only I and II are considered necessary. | Ganjam | Adoni nullah / Gullery river | I. | Bavankona reservoir | 195 | 2,295 | 2,970 | 5,79,300 | 195 | These reservoirs were proposed in connexion with the Rushikulya project and are included in the estimate for that project—*vide* Proceedings, Madras Government, Public Works Department, No. 1,293, dated 23rd May 1876. |
| | — | Jeroonuddy | II. | Soorada reservoir | 250 | 2,190 | 2,320 | 4,10,000 | 95 | |
| | — | Mahanadi | III. | Koullada | — | — | — | — | — | These reservoirs were also proposed with the Rushikulya project, but were not considered necessary. |
| | — | Do. | IV. | Boolagutch | | | | | | |
| | — | Goodaholo | V. | Goodaholo | | | | | | |
| | — | Do. | VI. | Mutchycotta | | | | | | |
| VII. and VIII. Included in the projects of the same name in List (B.) | — | Korkay | VII. | Mallada Tampara | 190 | 40½ | — | 18,258 Including upper work. | — | Included in the project of the same name, List 2. Proceedings, Madras Government, Public Works Department, No. 400 I., dated 13th May 1878. |
| | Vizagapatam | Sarada | VIII. | Kondakirla ava | 450 | 391½ | — | — | — | Do. do. Proceedings, Madras Government, Public Works Department, No. 2,994, dated 12th December, 1873. |
| IX. Investigated, but not examined by Chief Engineer for Irrigation. | Godavari | Yerracalwa | IX. | Unnamalunka reservoir | 673 | 4,320 | 12,096 | 8,14,000 | 67 | This project has been investigated, and the estimates are ready, though probably they will need some revision. |
| X. and XI. Have been merely suggested and not investigated. | — | Penner | X. | Gandicotta reservoir | — | — | — | — | — | These two large reservoirs were proposed by Colonel Lawford in letter printed with G.O., Public Works Department, No. 1,196, dated 8th June 1860, and are intended for the regulation of the flood waters of the Penner which that officer stated could be dammed back as far as the Kundairu. No investigations were ever made. |
| | Nellore | — | XI. | —— reservoir | — | No information. | | | | |
| XII. Preliminary report received. Investigation deferred. | Kurnool | Goondlacamma | | Moomadaveram reservoir | 2,000 | 67,743 | 67,743 | 41,00,000 | 60½ | Investigation postponed, as with the scanty population of the country commanded it was not considered likely that the water-supply would be made full use of until after the lapse of many years—*vide* Proceedings, Madras Government, Public Works Department, No. 1,035, dated 19th April 1875. |
| XIII. Has been merely suggested, and not investigated. | Do. | Kistna river | | Great Kistna reservoir | — | — | 81,000 | 6,00,000 | 7¼ | Proposed by Sir Arthur Cotton, but investigation could not be undertaken for want of officers—*vide* Proceedings, Madras Government, Public Works Department, No. 2,039, dated 22nd August 1873. |
| XIV. Partly investigated by the officers of Madras Irrigation and Canal Company and by Mr. D. Scott. The feasibility of constructing the bund seems doubtful owing to the depth of sand in the river-bed at proposed site. | Bellary | Chitravati river | X | pally reservoir | 2,070 | 24,543 | — | 14,68,000 | — | Partly investigated by the officers of the Madras Irrigation and Canal Company and by Mr. D. Scott, Public Works Department, G.O., No. 833 I., dated 17th October 1878. |
| XV. to XVII. Partly investigated by the officers of the Madras Irrigation and Canal Company. Are projects for which the Company have lately relinquished their claims to Government. | Mysore Territory | Budra river | XV. | | | | | | | |
| | — | Tunga river | XVI. | | | | | | | |
| | — | Choardy river | XVII. | ally reservoir | 758 | 10,750 | — | 9,30,000 | — | Do. do. do. Public Works Department, G.O., No. 2,322, dated 23rd July 1866. |
| | | | | reservoir | 769 | 6,020 | No information. | | | |
| | | | | r reservoir | 486 | No information. | | | | |
| XVIII. Partly investigated and postponed for want of officers. | Salem | Pooniar river | XVIII. | K | | | | | | |
| XIX. Partly investigated and rejected owing to engineering difficulties. | — | Stream from Shevaroy Hills. | XIX. | V rishnagiri reservoir | 1,892 | 24,300 | 24,300 | 52,50,000 | 216 | Partly investigated, Proceedings, Madras Government, Revenue (Famine) Department, No. 983, dated 19th April 1878. |
| | | | | niar reservoir | — | — | — | — | — | Partly investigated and rejected for engineering difficulties, G.O., Revenue (Famine) Department, No. 1,754, dated 14th August 1878. |
| | | Swatanuddy | XX. | Go | | | | | | |
| | | | | olanullay reservoir | — | — | — | — | — | Site examined and favourably reported upon by Major Pennycuick, R.E., in 1878. |

H 33

List of Projects for the Storage and Regulation of Flood Waters—*continued*.

| — | District. | River. | Project. No. | Project. Work. | Drainage Area in Square Miles. | Capacity in Millions Cubic Feet. | Water stored in Millions Cubic Feet. | Estimated Cost. Project. | Estimated Cost. Water stored per Million Cubic Feet. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| XXI. Has been merely suggested, and not investigated. | Coimbatore - - | Cauvery river - - | XXI. | ady reservoir - - | No information | - - | - - | - - | - - | Not yet investigated. |
| XXII. to XXVI. Partly investigated, but postponed for want of officers. | Malabar and Coimbatore. | Bhavani - - - | XXII | nula reservoir - - | 304 | 13,696 | — | — | — | Partly investigated. Mr. Fraser's report printed with Proceedings, Madras Government, Public Works Department, No. 2,043, dated 28th June 1866. |
| | - - - | Do. - - - | XXIII. | a reservoir - - | No information. | | | | | |
| | Nilgiris - - | Pykara - - - | XXIV | aud reservoir* - - | | | | | | |
| | - - - | Drainage into Moyar - | XX | Victoria - - | XXVII. was selected for the silting experiment by Mr. McIver. | | | | | Partly investigated, Proceedings, Madras Government, No. 2,006, dated 22nd August 1872. |
| | - - - | Poorthy - - | XX | ake St. Lawrence† - - | | | | | | Proceedings, Madras Government, No. 1,504, dated 18th June 1872. |
| XXVII. Investigated, and the work was taken up under the supervision of the late Mr. McIver, to prove the feasibility of the silting process in the construction of high bunds. The bund was washed away before it was completed, but the experiment was successful in proving the practicability of the silting process. | - - - | Do. - - - | XX | | | | | | | †McIver's bund. |
| | | | III. | Sandy nullah - - - | No information. | | | | | |
| XXVIII. Partly investigated, but postponed for want of officers. | - - - | Sandy nullah - | XIX. | Tank in the Thalihooth Manoor valley. | 89 | 252 | 335 | 1,20,000 | 358 | Investigated by Mr. D. Scott, Proceedings, Madras Government, No. 601, Revenue (Famine) Department, dated 7th March 1878. |
| XXIX. to XXXI. Preliminary reports have been received. Investigation postponed. | Madura - - | Pitchiaur - | XXX. | Pulney reservoir - - | 58 | 300 | 300 | 1,16,056 | 497 | Investigated by Mr. D. Scott, Proceedings, Madras Government, No. 686, Revenue (Famine) Department, dated 14th March 1878. |
| | - - - | Palaur - - | XXXI. | Gullapuram reservoir - - | 1,137 | 2,681 | 2,637 | 6,70,000 | 254 | Investigated by Mr. Sills, Proceedings, Madras Government, No. 491 I. dated 14th June 1878. |
| | - - - | Vigay - | XXXII. | Reservoir near Batlagoondoo - | No information. | | | | | Not yet investigated for want of funds, Proceedings, Madras Government, No. 1836, dated 1st July 1875. |
| XXXII. and XXXIII. Have been merely suggested, and not investigated. | - - - | Do. - | XXXIII. | Papanasanam reservoir - | Do. | | | | | Not yet investigated, Proceedings, Madras Government, No. 848, dated 31st March 1875. |
| | Tinnevelly - | Tambrapurni | | | | | | | | |

* The contoured plans for these reservoirs have been drawn out.

(Signed) J. O. Hasted, Lt.-Col., R.E.,
Ag. Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

Fort St. George, 13th February 1879.

From Major J. PENNYCUICK, R.E., District Engineer, Salem, to the CHIEF ENGINEER FOR IRRIGATION, dated Salem, 16th May 1878, No. 19 S.L.

I have the honour to forward a memorandum on the subject of the Periar Project, which I shall feel much obliged by your submitting to Government with any remarks you may think proper.

2. As I believe you are aware, I have been intending to send up this memorandum for some time past, but delayed doing so, partly on account of press of work, and partly to complete some inquiries on the subject of the manufacture of Portland cement.

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MEMORANDUM.

At a time when the prevention and mitigation of famines in India is occupying so much attention as at present, it may be considered as not out of place to draw attention to a work which gives promise of being highly remunerative in ordinary years, and of being of immense benefit to a large and important district, while as a protection against famine it may safely be said to be unrivalled by any work constructed or proposed in the Madras Presidency since the execution of the great delta systems of irrigation.

2. I allude of course to the Periar Project.

3. What gives this work its great superiority, as a preventative of famine over ordinary irrigation works, is that its water-supply is drawn from a country under different climatic conditions from that which it is to irrigate, and that the former will be unaffected by the drought of the latter. Ordinary irrigation works which merely store and utilize local supplies are affected by the same causes which affect the tracts which they supply, and consequently may fail at the time they are most needed. The larger the area from which the supply is drawn, the less of course is the latter affected by local conditions; but in all cases, except those of the great rivers, whose number is unfortunately limited, there is risk of failure, partial or total, at the time water is most wanted.

4. No competent judge would allow this one defect, or rather imperfection, to weigh against the numerous benefits derived from irrigation works even of the smallest class, but it does exist, and its absence in the case of any particular work stamps that work as one of a limited class of the very highest excellence.

5. The water supply of the Periar is drawn from a tract not merely distant from the plains of Madura where it is to be used, but different in its climatic condition; the former may be parched and dry from failure of successive monsoons, but no one has ever heard of the hills of the Western Ghats being deprived of rain, or of the streams which flow through Travancore being dried up. If these works had been in operation during the last two years, they would have produced food to the value of more than two millions of Rupees and it is difficult to over-estimate the diff[illegible] would have made in the condit[illegible] District.

6. How valuable soever a work may be as a protection against famine, it may not be desirable to undertake it unless it is in ordinary years at least sufficiently remunerative to insure the State against loss from its construction. The particular work in question is estimated to produce a revenue, after providing for the monstrous payment of Rupees 75,000 annually (a capital of fifteen lakhs of Rupees for some twelve square miles of uncultivated jungle) to the Travancore Government of not less than eight per cent. on its cost, and if this could be ensured it is hardly conceivable that there should be any hesitation as to carrying it out.

7. The question of revenue has been so carefully and thoroughly examined that there is hardly room for doubt concerning it; indeed I am not aware that any has ever been expressed, and the only point on which any doubt exists is whether the works can be constructed for the sum at which they are estimated.

8. As regards a considerable portion of the estimated cost all, that is, which relates to the works of distribution, there is not, nor can be, any doubt; these works are of an ordinary character, their cost is susceptible of accurate calculation, and they have been planned in detail, probably in fuller detail than any previous work of a similar kind, by one of the most careful and experienced officers in the Department, the late Mr. Smith.

9. The only doubt is with reference to the head-works, and with regard to these it will probably be admitted that the only serious doubt has reference to the construction of the main dam; it is with special reference to this point that this memorandum is written.

10. The project was first seriously taken up by the late Major Ryves, and he satisfied himself that the cost of a masonry dam so far exceeded that of an earthen one as to be prohibitory of the former; an opinion, it may be added, which, if the work were carried out as originally proposed by him, would be unquestionably correct.

11. All the officers who have subsequently dealt with the project have worked more or less on Major Ryves' lines, and though the difference between the project in its latest form and that originally drawn up by him is considerable, the deviations have been gradual, and the great earthen dam has always remained part of the scheme.

12. As finally worked out by Mr. Smith and submitted to Government in 1875, the project included a dam a hundred and seventy feet in height, to sustain a maximum depth of water of a hundred and fifty-five feet; this dam was to be constructed by means of the silting process introduced by the late Mr. McIvor, which not only greatly reduces the cost of earthwork, but also improves its quality to an extent which, in the opinion of two successive Chief Engineers for Irrigation as well as of Mr. Smith himself, removed the objection which might otherwise have been felt to the construction of an earthen dam of the unprecedented height above mentioned.

13. The late Chief Engineer, Major-General Walker, took a different view, and, while, admitting the generally valuable qualities of earthwork executed by the silting process, considered that sufficient experience had not been gained concerning it to justify our trusting to it for a work of such magnitude as the one in question, so that the Periar dam would really be a gigantic experiment carried out under somewhat unfavourable conditions.*

14. Holding these views, General Walker declined to recommend the project for execution, and his opinion was adopted by the Madras Government; there has I believe been some slight further correspondence and discussion on the subject, but nothing practical has come of it.

15. It is not proposed here to discuss the question regarding which this difference of opinion has arisen; personally I agree with those officers who think that the dam could be safely constructed in the manner proposed by Mr. Smith (whether his estimate is sufficient is another question), but no one in his senses will deny that there is an element of risk [illegible] uncertainty in the matter, and if that elem[illegible] the adoption of a d[illegible]ut can be entirely remov[illegible] involving [illegible]ifferent mode of construction, without [illegible]any expense above the estimate already made, [illegible]y cause which justifies the postponement of the [illegible]k will be removed at the same time.

16. It has already been stated that Major Ryves' opinion as to the excessive cost of a masonry dam as compared with an earthen one would be perfectly correct if the work had been carried out as originally contemplated by him.

17. Subsequent inquiry showed that this was not possible, and various subsidiary arrangements had to be made, notably as regards provision for the discharge of water during the construction of the work, which added so much to the cost of the earthwork as to render it doubtful whether a masonry dam would not be actually cheaper than of earth.

18. This point was never so far as I know seriously considered until 1875, when I submitted a note on the subject containing a rough estimate of the cost of a dam partly of masonry and partly of concrete, a construction which was (rightly) objected to on the score of risk of unequal settlement. Since that time I have studied the subject, and others connected with it, more deeply, and am now prepared to assert positively and with perfect confidence that a dam of rubble masonry with Portland cement (locally made of course) can be constructed at a cost certainly less than that allowed by Mr. Smith for an

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* Something was also said about the difficulty of closing the tunnel, but General Walker would probably have been the first to acknowledge, if he had had occasion to consider the point practically, that this difficulty had been very much over-estimated, and was in reality a very small matter.

earthen dam,* all subsidiary works included. With ordinary surki mortar it could be constructed for a still smaller sum.

19. A dam entirely of concrete, which for many reasons I consider a still better arrangement, will be somewhat cheaper than one of masonry. The objection of unequal settlement, the force of which I quite admit as against a combination of masonry and concrete, does not apply to a structure entirely of concrete, and there is good reason to believe that well-made concrete. is actually stronger than rubble masonry of the same materials.

20. To prevent misunderstanding I think it as well to note that I am not now contemplating the execution of the masonry by the process, a rough sketch of which was shown by me to the Chief Engineer for Irrigation in 1875. I believe that a considerable reduction in cost might be made by the adoption of this process, but the statement in paragraph 18 refers to masonry constructed in the ordinary manner "with stones not too large to "be conveniently handled," and with no special reduction in the amount of labour on account of the convenience of working on a large mass, or the careful and incessant supervision that will be available.

21. It is not now proposed to go in detail into the proof of the correctness of the above statement; to do this would involve a careful and minute examination into many distinct questions, and would lengthen out this paper and occupy my own time to an extent which would not be desirable unless I knew that there was a prospect of some practical result therefrom. For the present it is enough to say that the conclusion at which I have arrived is the result of a most careful and thorough consideration of the subject from every point of view, and of every detail connected therewith, and that I am confident of being able, if called upon to do so, to establish it to the satisfaction of any competent authority.

* It may be worth while to note here that I think both Colonel Mullins and Mr. Smith were mistaken in their expectation that a great reduction in the cost of tunnelling would be made by the use of machinery. The benefit of rock boring machinery is in the saving of time; tunnelling by its use is distinctly more costly than tunnelling by hand, even when the cheapest possible motor, water with a great head, is available. I have gone into this subject with some care, and believe that Mr. Smith's rate of 10 Rupees per cubic yard, though it was rather a guess, will very fairly represent the actual cost of such work for the large tunnel.

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## Minute by Mr. H. E. Sullivan, Madras Civil Service.

### Protection by Irrigation.

A tract of country can be said to be protected from the effects of drought by means of artificial irrigation only under certain conditions—

1. That the soil is suited to receive the artificial stimulus.
2. That the agricultural population to whom it is supplied understand this mode of cultivation and are possessed of sufficient means to avail themselves of it.
3. When the local demand for produce which can only be raised by means of artificial irrigation exceeds that for food crops which in ordinary seasons give a remunerative return without such artificial aid.

In the absence of these conditions experience has shown, in both the Madras and Bombay Presidencies, that to whatever extent the means of irrigation may be brought within the reach of the ryots they will not generally avail themselves of them; whilst the converse has been demonstrated beyond possibility of doubt in those parts of the country where such conditions were present.

As an instance of the former may be cited the tract n the Madras Presidency traversed by the canal of the Madras Irrigation Company, taken off the Tungabhadra river in the Kurnool district. A large proportion of the land comm[illegible] is composed of what is [illegible]y this work [illegible]ton soil. Of this locally known as "regur" or black co[illegible] or less an there are several varieties, some having more [illegible] admixture of loam with a natural subsoil drain[illegible] limestone, but a large proportion is of an argillaceo[illegible] texture with a pure clay subsoil impervious to water, s[illegible] much so indeed that even under the ordinary mode of cultivation it is necessary to break it up every few years by very deep ploughing. Now if the subsoil becomes thus impacted under the influence of the very moderate rainfall* of the district what would be its condition if subjected to the almost uninterrupted irrigation necessary to raise a crop of sugar-cane or rice. For an irrigation project to prove remunerative or even to pay its expenses such crops must be cultivated, the rates leviable for the occasional flooding of dry grain crops (from one to two rupees per acre) being insufficient. But to irrigate such lands year after year to the same extent as the rice fields of the Cauvery and Godavari deltas would be to render them sterile and water-logged instead of developing their productive powers, unless indeed an expensive system of artificial subsoil drainage, which would be entirely beyond the means of the cultivators, be adopted. And here another difficulty presents itself to the extension of irrigation in tracts such as that under consideration. A not uncommon idea is that when an irrigation canal commands a certain area of country all that the ryots have to do is to turn the water on to their fields as it flows from the sluices, whereas, as a matter of fact, a heavy outlay is necessary to prepare the land in the first instance for the reception of the water, and a further annual expenditure is required to maintain the higher description of farming which irrigated crops demand. A holding of, say, 20 acres may be commanded by a canal in so far that the level of the sluice is above the highest point therein; but if the ground undulates the whole plot has to be reduced to a level which will admit of a gentle uniform flow over the entire surface. The cost of this varies according to circumstances, but an average estimate of Rupees 20 per acre is within the mark. In the long run it might prove remunerative to a capitalist to incur such outlay and to lay himself out for the more expensive farming required by irrigated cultivation, but the majority of the ryots have not the means to enter on such an undertaking. They are dependent from year to year on the produce of their fields, their other sources of income, when such exist, being comparatively insignificant, and it is a great object with them to dispose of their surplus as soon as the crops are harvested. When these consist of the cereals and pulses which form the staple food of the locality they have no difficulty in doing this, for the local dealers are prepared to take whatever they can again sell at a profit in the vicinity, but, their transactions being limited to the neighbouring markets, they are shy of an article for which there is little or no local demand, and which can be remuneratively disposed of only at a distance. Under such circumstances, although its intrinsic value might be less, a good crop of jowari in a remote rural tract where the people lived on unirrigated grain would be more useful to a ryot than one of rice. The case is different where lands are in the vicinity of towns and large trading [illegible] such localities the people avail themselves [illegible] the means of irrigation, but these [illegible] to the r[illegible] [illegible]s t[illegible]e.

The above are some of the causes which have prevented the water brought into the Kurnool district by the Madras Irrigation Company's project being utilized. The financial position of the work is shown at page 24 of the Irrigation Committee's Report, and does not hold out much encouragement for multiplying and developing such projects.

Similar causes have operated to prevent the spread of irrigation in the Deccan Provinces of the Bombay Presidency, as reference to the Irrigation Revenue Report for 1876-77 will show. From this it appears that within the last thirteen years Rupees 1,20,74,676 have been sunk in the construction of irrigation works in Bombay, and the financial result at the end of the year under report is a deficit of Rupees 24,25,100 notwithstanding that the report embraces the worst of the famine years when the irrigated area went up at a bound from 7,000 to 17,000 acres (*vide* paragraph 15). A hope is expressed that this improvement may continue, but, as the area for which water was taken hardly varied until the drought declared itself, it is doubtful whether this anticipation will be realized, especially when it is considered that the area irrigated, in a season almost unprecedented in its severity, was less than one-twelfth of that actually under command at the time and only one-twentieth of the extent the works were designed to command. These disappointing results are ascribed partly to the works being of very recent construction

* Average 36·01".

and partly to the "ignorance, improvidence, and in- "debtedness of the ryot and his extreme dislike to "change in respect of a system of agriculture practised "for generations." In regard to the first cause it may be observed that one work has been in operation for 11 years, viz., the Jamda Canals, referred to at paragraphs 122 to 163 of the report, which command an area of 30,000 acres estimated to yield a gross annual revenue of Rs. 85,700. In 1866-67, the irrigated area was 610 acres; in 1870-71 it was only 338 acres; in 1871-72, a year of deficient rainfall, it went up to 1,234 acres, declined the following year to 265 acres, and never touched 400 acres again until the famine year of 1876-77 when it rose to 1,535 acres. The financial results of the project up to the end of that year as taken from paragraph 153 are as follows :—

| | Rs. |
|---|---|
| Capital outlay - - - | 9,79,795 |
| Revenue receipts - - | 22,314 |
| Working expenses - - | 1,07,058 |
| Deficit - - - | 84,744 |
| Interest charges from 1866-67 to end of 1876-77 - - | 3,90,172 |
| Total loss - | 4,74,916 |

At paragraph 156 of the report it is mentioned that in the succeeding year 1877-78 the irrigated area had extended to nearly 5,000 acres, and a hope is recorded that this improvement may continue. It seems very doubtful whether this anticipation will be realized, for a reference to paragraph 132 plainly shows that irrigation under this work fluctuates in accordance with the rainfall, expanding when it is below, and contracting when it exceeds the average which in Jamda is stated to be 25·53 inches. In 1877-78 it was registered at 16·27 inches, which accounts for the sudden extension in that year, but hardly justifies the inference that it will continue on the return of a normal season.* Similar results will be found recorded at paragraphs 554—587 in regard to the Kistna Canal, which was opened for irrigation in 1868, and which at the end of 1876-77 exhibited a total loss of Rupees 3,26,548. This work was estimated to irrigate 27,500, but up to and including the year under report the average extent irrigated amounted to only 1,964 acres.

These two works are fair types of other irrigation projects in the Deccan, and it seems absurd to say that after an experience of 11 and 8 years, respectively, they are not to be judged by results. At page 4 of another pamphlet issued by the Irrigation Department, giving a forecast of expenditure for five years ending 1883-84, it is stated that the irrigating power of works should become sufficiently developed to cover entirely the interest charges at the end of the tenth year, the ultimate results being realized at the end of the fifteenth. It is difficult to understand the grounds on which the department base this sanguine anticipation. It certainly is not warranted by the experience gained up to date, which shows that, although at a vast cost the means of irrigation have been placed at the disposal of the agricultural community, they have declined to avail themselves of the advantages except to an inappreciable extent. This disinclination on their part is set down to their ignorance, their improvidence, and indebtedness, but a more valid reason will be found at paragraph 160 of the report, the pith of which is, that in normal seasons it pays the ryot better to cultivate a crop that does not require irrigation. This hardly bears out the assertion that he is blind to his own interests, nor does the fact of his declining to enter on a mode of cultivation beyond his means attest his improvidence. But it is argued these works are necessary for the protection of the country in seasons of drought, and therefore, although the ryot may not want the water in ordinary seasons, though it would be positively against his interest to take it, he must be made to pay for it for ever and ever as an insurance against drought in years of deficient rainfall. Now the mere fact of the means of irrigation being available is in itself no protection against a failure of crops if the ryots are unable to make use of them, and the experience of 1876-77 shows that they can do so only to a very limited extent, even when the necessity for water is the greatest. This being so, the question arises whether the imposition of an insurance rate which will enhance the existing land assessment by 25 per cent. will at all help the matter forward and place the Deccan ryots in a better position to avail themselves of the means of irrigation when, at distant intervals, seasons of drought come round. At paragraph 4 of Colonel Merriman's letter to the Secretary of the Famine Commission, dated 24th September, No. 1077, p. 142 of 1878: "It is hoped that this mea- "sure will, in course of time, stimulate the people to "use the water more freely!" Was ever fallacy more transparent, or invasion of individual liberty of action more complete? As an administrative measure, intended to protect the interests of the State which have been seriously affected by a large unprofitable outlay, this might at first sight be considered to be beyond the scope of the present inquiry; but as the poverty of the ryot is an admitted cause of his inability to withstand the effects of bad seasons, any step calculated to add to his present burdens would seem to merit attention.

But at any rate when, undeterred by the experience summarised above, a proposal emanates from the Government of Bombay, involving an expenditure of nearly four crores of rupees during the next five years in the construction of similar works in that Presidency, there can be no doubt that the Commission are bound to record an opinion as to whether the expenditure is likely to attain the object in view, viz., the prevention or mitigation of the effects of a deficient rainfall, or whether the money might not be more advantageously employed in another direction.

For the profitless expenditure recorded in the Irrigation Revenue Report for 1876-77, quoted from above, there is some excuse. In other parts of India artificial irrigation had proved a priceless boon to the people and a source of revenue to the State. It was a pardonable mistake, therefore, and one that was shared by the most competent authorities on the subject, to suppose that similar results would follow its introduction into those parts of the Bombay Presidency where cereals and pulses, requiring only a moderate natural rainfall to bring them to maturity, were grown. Experience has now demonstrated that this view was an erroneous one, and having this dearly bought experience, it is difficult to understand how it can be sought to perpetuate the mistake as proposed in the forecast of expenditure on irrigation works for the five years ending 1883-84. It would occupy too much space to follow this paper in detail. The ultimate results anticipated will be found in Appendix III., and these, it is expected, will be realized at the end of the fifteenth year from the date of completion of each work. Summarized they are as follow :—

| | Acres. |
|---|---|
| Area capable of being irrigated - - | 514,831 |
| | Rs. |
| Gross revenue - - - - | 28,86,915 |
| Net revenue, after deducting working expenses and interest - - - - - | 8,69,183 |

The only objection to be taken to these figures is, that the revenue which the works are estimated to yield after 15 years is contingent on irrigation being taken for the whole area indicated at an average water-rate of between Rupees 5 and Rupees 6 an acre,—a result very far from being warranted by past experience. At paragraph 6 of the forecast the success of the Mutha Canals is quoted as affording a good basis for the sanguine anticipations of the Irrigation Department; but a reference to paragraph 365 of the report for 1876-77 shows the financial results of this project, which has exceptional advantages in furnishing the water supply of Poona and Kirkee, to be a loss up to date of Rupees 5,26,274.

From this exposition of facts it would appear that, however valuable the means of artificial irrigation may be in provinces where the conditions indicated in the first paragraph of this minute are present, it cannot be relied on as a protection against the effects of drought in large tracts of country where such conditions are absent. It may further be observed that the proposal to add to the fiscal burden of the agricultural community in order to force them to adopt a system of cultivation unsuited to the soil and the food-requirements of the local population, and for which they possess neither the knowledge nor the means, on the plea that their European rulers understand their interests better than they do themselves, is a policy of so questionable a

* NOTE.—Since these remarks were written a return for the whole Presidency for the years 1877-78 and 1878-79 has been received. As above mentioned, in 1876-77, when the average rainfall was registered at 14·43, the irrigated area went up from 7,000 to 17,000 acres. In 1877-78, with an average fall of 22·36, it further increased to 25,287 acres, but in 1878-79, when 31·13 inches were registered, it suddenly fell again to 15,362 acres.

nature that it is hard to understand how it ever came to be entertained as a possible administrative measure.

H. E. SULLIVAN.

Madras, 11th April, 1879.

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P.S.—Since the above went to press a memorandum by the Chief Engineer for Irrigation in Bombay, dated 22nd July, 1878, has come to hand, in which, directing attention to the extension of the irrigated area under the Jamda Canals from 1,536 acres in previous years to nearly 5,000 acres in 1877-78, Mr. Hart observes, "It is "a significant fact, remembering how much is said of "the cost of preparing fields for irrigation, that the "people *could* suddenly expand the area so considerably. It is often stated that the preparation of land "for irrigation costs not less than Rupees 30 an acre;" and he then proceeds to show by figures that the people must have expended over a lakh of rupees that year in the preparation of the land. The reply to this is that it is the preparation of land for *permanent* irrigation which is costly, but it is not so for the occasional floodings which dry crops require in seasons of drought. That a large proportion of the irrigation in 1877-78 was of this description is shown by the fact that in the succeeding year the irrigated area of the Presidency fell off again to the extent of more than 10,000 acres. It would be interesting to see the figures for the same year for the area under the Jamda Canals.

H. E. S.

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## IRRIGATION AND COMMUNAL LABOUR IN THE MADRAS PRESIDENCY.

By A. T. ARUNDEL, B.A., Lond., Madras Civil Service.—COIMBATORE, *August* 1879.

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### CHAPTER I.

*Nature of Irrigation Works.*

*Irrigation works* consist mainly of—

(*a*) River-fed channels, and reservoirs or tanks, and

(*b*) Rain-fed reservoirs or tanks.

*Irrigation channels* are artificial watercourses supplied from a river, stream, or other source, and tapped by numerous sluices which draw off the water to the lands under irrigation. The water is usually raised to the required height in the river or stream by a masonry weir or dam known as an "anicut," built athwart the course of the river, not only raising thereby the level of the water, but also diverting it into the artificial channel. Most of the rivers in Southern India are thus tapped by masonry weirs at different points. Some rivers are so effectually drained of their supply in this way, that except in high floods, the lower part of their course is dry. Thus the little river Noyel, a tributary of the Cauvery, has a course of only 90 miles, but is drained by no less than 25 masonry weirs supplying channels to irrigate over 19,000 acres. The river Tambrapurni in Tinnevelly is drained by eight important weirs irrigating over 122,000 acres. Over the Sittar, a tributary of the Tambrapurni, there are 18 weirs. There are, altogether, 41 weirs draining the Tambrapurni and its various tributaries.

In many places channels are made by a diagonal excavation through the river bed and bank, without any permanent weir or dam. These are termed Koramboos. All natural rivers, streams, and other watercourses, not lying within a private estate or zemindari, are claimed by the State, and the distribution of the water-supply for the benefit of the public is an important function and duty of the Government. Mr. Justice Innes, in his judgment in the case of Ponnasami Tevar *v.* Collector of Madura (5, M. H. C. R. C.), said: "I quite admit that "the Government of this country has at all times assumed "to itself, and *has the right in the interests of the public*, "to regulate the distribution for use of any portion of "the water flowing in the natural channels in which "rights have not as yet been acquired." The Government further possess and exercise the right of levying a tax or cess from those to whom water is supplied. When water is supplied for irrigation the charge is either merged into the general rent, or tax, or assessment of the land, or is levied as a water-rate at so much per acre. When water is supplied for municipal purposes the charge, if any, is made with reference to the special features of the case. The municipality of Tuticorin in Tinnevelly, for instance, pay a large sum monthly for the water supplied to the town by the Government channel fed from the river Tambrapurni.

The lands that lie under the irrigation of river channels are usually of two kinds. (1.) They may form part of a delta deposited by the river itself. This is the case with the rivers Godavery, Kistna, and Cauvery, where the bulk of the irrigated lands form part of the great deltas of the districts, Godavery, Kistna, and Tanjore. (2.) They may form riparian tracts, and lie on either bank of the river, usually in long strips more or less parallel to the course of the main stream, forming in fact part of what is usually known as the river-valley. This is the case with the channels from the Cauvery and its tributary, the Bhowani, irrigating large tracts in the districts of Coimbatore and Trichinopoly. So too with the rivers Pennar in Nellore, Palar in North Arcot, Vigay in Madura, and Tambrapurni in Tinnevelly. Occasionally a hilly ridge or watershed may be cut through, and water carried completely out of the natural river-valley. This is the case with the Kurnool and Cuddapah Canal from the river Toongabudra.

The irrigation channels thus supplied from the rivers will vary in length according to the size of the river, the water-supply made available by the weir, and the extent of land which the physical conformation of the country will allow to be brought under irrigation. One of the channels from a weir over the Noyel in Coimbatore is only two or three miles long, and irrigates only 50 acres. The Kalingarayen Channel supplied by the river Bhowani, in the same district, has a course of 56 miles, and irrigates 7,980 acres, paying an assessment of Rs. 87,600 (8,760*l*.). The main channel of the eastern delta of the Godavery district and its offshoots comprise a total length of 150 miles. This canal is 184 feet broad, and 8 feet deep at the head. The water that pours through these various irrigation channels is drawn off by numerous sluices built in and through the channel bank, at varying intervals, wherever required. An irrigation channel may be compared to the water-main or pipe that carries the water-supply of our cities and towns in England. The main receives its supply from the river or from the reservoir, and is tapped by numerous smaller pipes throughout its course. Each of these small pipes, supplying dwelling-houses, factories, &c., is regulated by a stop-cock or tap, which arrests the flow when the proper quantity of water has been drawn off. In the absence of such stop-cocks, it is obvious that the water would escape and run to waste through every minor pipe; only those near the head of the main would be certain of their supply, and those at the extreme end of the main would probably fall short and run the risk of having no water at all.

Now the principle is exactly the same with the channels for irrigation, with this all-important difference: The irrigation channel has no self-acting stop-cocks, and but too frequently no stop-cocks or taps at all. The better sluices have moveable shutters, by which they can be closed, but for the most part they are mere masonry pipes or apertures which can only be closed with difficulty by plugs of turf and stone, or mud. Sometimes there is no masonry work, but the channel bank is cut right through, to allow the water to flow on to the lands to be irrigated. One of the channels from a weir across the river Noyel in the Coimbatore District, which is intended to supply a large tank or reservoir and irrigates 1,380 acres, has only two masonry sluices,

and the supply in the reservoir often fails, because the channel is drained by various cuts through the bank before it reaches the reservoir. In such cases the higher the level of the water flowing in the channel, the greater is the amount drawn off through the open cut, and the greater the waste.

It is obvious that the extent of land to be irrigated by each sluice must vary with the level of the land and other circumstances, so that one sluice may irrigate 10 acres, while another may irrigate a hundred, and so on. Clearly, then, the sluices should have apertures corresponding with the area of land to be irrigated. If from a London water-main the supply pipes to a big brewery and to a small dwelling were of the same size, we should say there was a radical mistake. Either the brewery must get too little water, or the house must get too much. This radical mistake is of constant occurrence in the sluices of the old irrigation channels. The sluices are often built with little or no reference to the area to be irrigated, further than to make sure that the vent or aperture is amply large. With sluices built on this principle, or want of principle, throughout the course of a long channel, it will readily be conceived that the water-supply may be all drawn off before it can reach the sluices at the far end of the channel. Open cuts through the bank, in lieu of sluices, of course make the mischief still greater.

The following figures give the sizes of a few consecutive sluices, with the areas to be irrigated by them, in an important channel from the river Noyel, which has to irrigate altogether 4,000 acres of land. There are nearly 70 sluices in this channel, and the following list is an excellent sample of the rest, and of the sluices in numerous other channels as well :—

| Sluice No. | Aperture, size in inches. | Area irrigated in acres. |
|---|---|---|
| 32 | 16 × 16 | 76 |
| 33 | 16 × 16 | 15 |
| 34 | 14 × 14 | 6 |
| 35 | 12 × 12 | 20 |
| 36 | 14 × 14 | 194 |
| 37 | 14 × 14 | 40 |
| 38 | 14 × 18 | 20 |
| 39 | Open cut through bank | 14 |
| 40 | 28 × 18 | 41 |
| 41 | 24 × 26 | 10 |
| 42 | 11 × 6 | 4 |
| 43 | 15 × 16 | 119 |

Here it will be seen that the largest area under any one sluice is 194 acres, and that the aperture of that sluice, No. 36, is 14 inches square. But the next sluice-vent, No. 37, is the same size, and has to irrigate only 40 acres. The next again, No. 38, is still larger and has to irrigate only 20 acres. Worst of all, No. 39, an open cut or gap through the channel bank, irrigates only 14 acres. The largest sluice-vent of all, No. 41, is a huge cavity more than two feet square, which has to supply only the trifling area of 10 acres.

[redacted] amount of water wasted in this way is almost incredible. At spots w[redacted] tracts collects, volumes of water may often be seen pouring into the river when the crops at the lower end of the channel, some miles further down, are withering for want of the very supply that is being wasted above. Large sums of land assessment are by consequence annually lost to the State revenue, and tracts of land are left fallow or grow inferior grain, that under a better system would be yielding heavy crops of rice. The loss, however, falls most heavily on the ryots or farmers. If the distribution of the water is left in their hands, and there has been no drought or scarcity of water, the failure of crop at the lower end of the channel is usually regarded by the revenue authorities as the fault of the ryots, and the land tax is collected from them instead of being remitted. In 1875–6, Rs. 1,10,725 (11,072*l.*) were thus collected in the Tanjore District alone, on account of about 30,000 acres left uncultivated, for this reason. Over the whole Presidency 136,000 acres were similarly left uncultivated and the land assessment thereon, amounting to Rs. 5,78,000 (57,000*l.*), was collected. The farmers are thus doubly losers, for they not only lose the crop which should maintain them and their families, and meet the land tax, but they have to find means to pay the tax into the bargain. If, however, the tax or assessment is remitted, they are impoverished in failing to raise the crop, for which an ample supply of water exists.

Nothing has been said so far of the necessity for the careful conservancy and repair of the channel banks. As irrigation channels from their very nature are above the level of the adjacent country which they irrigate, it is obvious that they must be confined by an artificial bank on one or both sides Generally speaking, as channels are led along a gently sloping country, the artificial bank is required only on the lower side. Here, however, it is of the utmost importance, as the existence of the channel depends on the stability of the bank. Such banks are almost invariably of earth, and are liable to injury and deterioration by the attrition of the water flowing in the channel, and by the passage of men, cattle, and carts, at various crossing places. When the channel is in flow, damage by attrition is usually detected and set right by the villagers at once. It is during the dry season, however, when there is no water in the channels, that the banks are chiefly injured by traffic. When the rainy season begins, it is often ushered in by a heavy flood, and all weak places in the channel banks are severely tested. If the bank is unable to bear the pressure, or if it be over-topped by the water, a breach occurs, and great damage ensues, both to the bank and to the fields below, which timely attention and a trifling amount of labour would have prevented.

*Tanks.*—The artificial reservoirs of water for irrigation are known throughout Southern India as tanks. They vary in size from mere ponds, irrigating two or three acres. to considerable lakes, like the Chembrambakam Tank near Madras, which irrigates nearly ten thousand acres in thirty-three villages. Tanks may receive their water-supply either by means of channels from rivers or by means of streams or watercourses fed by the local rainfall of a more or less extended area. Most of the foregoing remarks regarding river-fed irrigation channels will apply with equal force to the reservoirs supplied by them. A few words, however, will be necessary regarding the second class, usually known as rain-fed tanks, the number of which, large and small, in the Madras Presidency is above twenty-five thousand. The vast majority of these reservoirs were built by, or under the orders of, the native rulers prior to the British conquest. They usually consist of a great crescent-shaped earthen bank or dam, thrown across the drainage slope of the country, thus arresting the passage of the water, which is dammed up against the bank, and reaches backwards as far as the rising slope of the country will permit. The safety of the bank is usually secured by a waste weir of masonry, over which the surplus water flows, when the tank is as full as the safety of the bank permits. The water is drawn off for irrigation by means of one or more sluices, usually of masonry, under or through the bank. Most of what has been said regarding channel sluices applies equally to the sluices of these rain-fed tanks. The reservoirs, however, are liable to injury from causes special to themselves alone. During [redacted] Works Commission in [redacted] current testimony to [redacted] the inquiry of the Pu[redacted] might do [redacted] 1869, there was generally con-neglect [redacted] the fact that, whatever the ryots a ch[redacted] irrigation channels, they constantly [redacted] the rain-fed tanks. Neglect of, or injury to, [redacted] nel was at once apparent, and the labour expended on repair was immediately and obviously repaid. With rain-fed tanks, however, the case is quite different. The supply to many, if not most of them, is uncertain. The bank may be worn down by cattle in the dry season, and otherwise injured, but if the rainfall be scanty, or even moderate, no harm may ensue that year or the next. The waste weir itself is blocked up to a higher level by turf and stones and planks, to retain as much as possible of the precious water, and it may not be till a flood comes and tears a large gap through the bank that the villagers recognise too late the precarious condition their reservoir was in.

## Chapter II.

### *Present System of Management and Supervision. Its Defects.*

It is necessary now to examine a little further and enquire into the cause of the comparative inefficiency of so many of our old irrigation works.

*Management and Supervision.*—The management, control, and up-keep of the irrigation channels, and the distribution of water, is usually shared between the two administrative departments chiefly concerned, viz., the Department of Public Works, and the Revenue Department including the village officials. The up-keep and repair of the channels sometimes rests with the Engineers, and sometimes with the villagers. In the

former case the cost comes out of State funds. In the latter case, the villagers supply what is called "customary labour" (kudi maramat), or money or grain in lieu of it, according to their owh arrangements. The former method fails from its irregularity. The Government allotment for repairing a channel, removing sand, silt, weeds, &c., is not a fixed annual amount, but is liable to vary with the demands for repairs elsewhere, and with the condition of the Imperial exchequer, which ruthlessly cuts down the allotment for a whole district or Presidency, when the financial equilibrium of the Empire is uncertain. The allotments, moreover, even when funds are available, are not, as a matter of course, made annually, but often at intervals of several years, during which time the channel is silting up, becoming choked with weeds and vegetation, and generally deteriorating. A small sum spent annually in removing silt and strengthening the channel banks is far more effective than a larger sum spent at intervals of several years, provided the works be in a sound state to start with.

The system under which the repairs are left to the villagers is more in accord with the habits and customs of the people, and was in ancient times almost universally in force. It fails from its uncertainty. Under former rulers each man was *compelled* to contribute his quota of labour or money, and all repairs were carried out in this manner with supplementary assistance from the State. Under the British rule, in spite of an Act (No. 1. of 1858) passed to maintain the system, such customary labour has been falling into disuse; and the provisions of the law are insufficient to secure it. If State funds are spent by the Department of Public Works, the villagers naturally leave everything to the State, and do as little as possible themselves. If, as is sometimes the case, the customary labour is commuted by the villagers themselves to a money equivalent, it is practically impossible for the revenue authorities to enforce payment of the amount, and see it properly spent. The evidence recorded by the Public Works Commission in 1869 shows that the provisions of the Act for this end are quite inoperative.

The admission of the water into a channel through the head sluice, if there be one, is usually in the hands of the Department of Public Works. The actual distribution, however, of water from the channel rests sometimes with the Engineers, and sometimes with the Revenue authorities or the villagers. The two departments in concert are supposed to decide on the needful repairs and changes, removing silt, sand, and weeds, enlarging or reducing old sluices, building new ones, and generally regulating the distribution of the water. On all channels of any importance there is usually a small staff of subordinates who are entrusted with the duty of opening and closing the sluices, and looking after the distribution of the water throughout the whole [illegible]. They are sometimes paid by a [illegible]th of the channel. [illegible] and sometimes by con-deduction from the revenue, [illegible]nels, shared by tributions from the villagers.

The double responsibility for the chan[illegible] Public the Revenue authorities and the Department of [illegible] the Works, too often results in failure. What is [illegible] business of either department is apt to become the business of neither. The officials of each are apprehensive of trenching on the rights and duties of the other, or, worse still, are jealous lest their own rights and functions be trenched on by the others. If the revenue officers find a great waste of water going on, they will perhaps wonder why the Engineers do not build a better sluice. If the Engineers note the same thing, they will think it odd that the revenue officers permit such a lavish and unnecessary supply of water. On special and important occasions, the two departments unite with ease to effect the needful arrangements. But for ordinary affairs, each department, having its own special work, is not brought into contact with the other. There is no regular and consistent concert between the two.

The consequences of this maladministration are usually patent enough. The ryots or native farmers are not trained or accustomed to economize the water, and, thinking only of their personal interests, never dream of arresting the rush of water through the sluices leading to their fields, after they will have drawn off enough for their own needs. They prefer an abundant flow of water on account of the fertilizing silt which it deposits on the fields, and they will often tear down the masonry of a sluice with a crowbar, to enlarge the vent, and so ensure an abundant flow. In some channels under the care of the Department of Public Works, where the sluices are fitted with shutters fastened by lock and key, the latter is often left with the overseer of that department, whose other duties prevent him from giving an uninterrupted attention to the distribution of water; and complaints arise that enough water is not allowed. As prompt action is needed to save a withering crop, the villagers find the crowbar more efficient than circuitous complaints through a series of officials; the masonry of the sluice is torn down, and the water rushes through in volume to the detriment of crops lower down the channel. In many cases, the damage is done without even the show of excuse just mentioned, but simply to secure a large flow of water over the fields. The mischief is usually effected durng the night when there is little or no fear of eye-witnesses to offer legal evidence in support of a prosecution. As a matter of course, the offenders escape detection and punishment. It is the interest of no one, save the landholders lower down the channel, to bring the mischief to light. These latter do not care to waste time and money in complaints, too frequently fruitless, at the public offices.

Besides the injuries done to existing sluices, further damage is caused by new cuts through the channel bank, or by the building of additional sluices, which are not only superfluous, but involve great waste of the fertilizing water. The first step taken by the ryot concerned is to secure by persuasion or purchase the silence of the village officers and the channel overseers (monigars). The new cut is then made, and probably escapes notice by the superior officers for a considerable time. If enquiry be made, the village officials represent that the extra supply is essentially necessary to the irrigation of the village. In course of time the open cut is seen by a superior officer, who, very possibly ignorant of the former condition of the channel, is led to suppose that it has been properly authorized. A storm of protests is raised at the suggestion of closing the cut; and the only remaining course is to limit the flow and strengthen the bank by building a masonry sluice. This is accordingly done, perhaps at the voluntary expense of the landholder or farmer profiting by it; and the villages at the further end of the channel are made perpetual sufferers in consequence of this additional drain on the supply.

It may be remarked *en passant* that no thorough improvement or reform can be effected until there is a complete map or plan of every channel, showing every sluice and masonry work, and every cut, and the area irrigated by each, ready for reference by both the revenue officers and the Engineers. There is probably not a single district in the Presidency where such sketches and lists are in existence for every irrigation channel in it. What should we say in England of a water company that had no accurate information of the number of taps and minor pipes taken off the main? The shares of that company would hardly be at a premium. A case recently came to notice where a channel overseer (monigar) had never seen for five months, and of course had never brought to the notice of his superiors, a considerable breach in a channel bank which effectually prevented a large reservoir or tank from receiving a supply of water. The result of the present system of management, or rather mismanagement, [illegible] expressed as leaving the ryots to [illegible] with the water-supply, to the constant detriment of the villages under irrigation at the end of the channel, and, by consequence, to the serious loss of the State revenue. The evil results of such mismanagement are steadily increasing. Every new sluice not absolutely needed for irrigation means so much taken from the water-supply of villages lower down the channel. This is the true explanation of the dearth of water at the end of many of our large channels, and of the necessity of permanently transferring large areas once irrigated to the head of "dry." Such changes are sometimes attributed—with what injustice may be now seen—to the scantier rainfall and defective water-supply of the rivers in recent times.

In illustration of the actual working of the system described in the preceding pages, the following particulars are given regarding a small channel supplied from the third weir across the river Noyel. It is one of the twenty-five fed by that river, which together irrrigate 19,000 acres, yielding a revenue of Rs. 1,40,000 (14,000*l.*) It has a total length of about six miles, and is intended to supply four tanks or reservoirs, and to irrigate a total area of 2,477 acres. Between the head or beginning of the channel, and the first of the four reservoirs or tanks, there were, a short time ago, eighteen sluices and one open cut through the bank. The sluices had vents of such capacity that they would suffice to irrigate an area of over three thousand acres. The area actually irrigated by them is only 183 acres. None of the sluices

were provided with shutters or plugs.* Huge volumes of water of course escaped into the river before the channel reached the first reservoir. Last season (1878) 200 acres that ought to have been irrigated lay waste, or grew inferior crops, and Rs. 700 (70*l.*) of State revenue was lost owing to deficiency of water. To bring about a better state of things, the chief landholders, at the suggestion of the authorities, consented to defray the cost of regulating the sluices in question, and the Engineer found everything could be set right for Rs. 325 (32*l.* 10*s.*), or half the sum lost to Government in a single year. The money was paid as promised, and the work has recently been completed by the Department of Public Works.

The actual loss of revenue on the twenty-five channels supplied by the Noyel river in 1875-6 was Rs. 27,856 (2,785*l.*) on 3,051 acres. As the total revenue should be Rs. 1,40,000 (14,000*l.*), this is a loss of 19 per cent. It is not asserted that the whole of this amount could be saved to Government by careful economy of water. That the bulk of it, however, would be saved is certain. It is difficult, if not impossible, to show by figures the full loss to Government, or to the cultivators, by the waste of water for irrigation. In many instances the landholder, finding the water supply insufficient, sinks a well to supplement it, and continues to pay the high tax for irrigated land, although no crop would reach maturity without constant irrigation from the private well. Here the cultivator is the loser, for if his land had been properly irrigated from the channel he might have invested his capital in sinking the well on unirrigated land elsewhere, or otherwise have utilized it. In other cases, as the channel supply is insufficient to raise rice, an inferior grain (ragi, cholum, &c.) with smaller yield is grown instead. Sometimes the full tax is levied on such land, and sometimes a reduction is made. Loss thus ensues certainly to the cultivator, and often to the Government.

In other cases, again, lands which would be irrigated if the channel water were properly economized have been left without irrigation for so long that they are transferred in the public accounts to the head of unirrigated, and only the tax for unirrigated land is charged against them. Here both the cultivator and the Government are permanent losers. There are two fine channels fed by the Bhowani river, which irrigated at the beginning of the century 16,000 acres. Of this area 500 acres have been permanently transferred to "unirrigated," and a revenue of Rs. 1,400 (140*l.*) per annum is lost to the State. Both of these channels receive a supply of water sufficient for all needs, and calculations regarding the larger one [illegible] ing 12,000 acres more than the area it now supplies, which is 12,700 acres. In two taluks or sub-divisions of the Tinnevelly District 440 acres formerly irrigated have been re-registered as "dry," and a permanent loss to the State of Rs. 2,150 (215*l.*) per annum has ensued. These are but casual illustrations of the matter in hand. No such information for the whole Presidency is on record.

Colonel Mullins, in his minute, printed with the Report of the Public Works Commission of 1869, remarked :—

"The distribution and management of water in Tanjore is virtually free from any Government control whatever, though occasionally the revenue officers do interfere to prevent loss of crops by diverting water to those parts of a taluk which, from whatever circumstances, may be receiving a totally inadequate supply; and under very great emergency the Collector has occasionally intervened to divert water from lands which were not receiving too much water to those which were getting next to none at all. It does not require argument to show that the absence of any administration of the water-supply by the officers of Government, and leaving distribution practically to be managed by those who have in most cases cultivation of their own, and who cannot possibly be supposed to study the general interests of the community, until at least their own interests have been fully provided for, must lead to great abuses, as also to a great waste of the water-supply."

There are 10,000 acres of land in the Tanjore District, nominally under the irrigation of the river Cauvery, which, by the accounts of 1875–6, lie waste for want of water, and the assessment thereupon, roughly amounting to Rs. 50,000 (5,000*l.*) is annually lost to Government. Writing in 1869 of one of the taluks now referred to, Colonel Mullins remarked: "As there is plenty of "water, it must be a matter of great regret that this "water is not made available, but suffered to run to "waste into the sea." The loss to the native farmers, and therefore to the wealth of the district, is in the rich district of Tanjore more than twice the amount of the assessment, or more than a lac of rupees (10,000*l.*) per annum.

Similar facts and figures are not available to show accurately the loss from waste of water to Government, and to the wealth of the country, throughout the whole Presidency. The following statement, however (compiled from the revenue returns of 1875–6) will throw considerable light on the matter, and will not err on the side of exaggeration. Excluding from consideration the districts of Ganjam, Salem, Malabar, South Canara, Godavery, and Kistna; the first two because no information is available, the second two because they possess no irrigation works properly so called, and the last two for reasons to be given below; the following result remains. In 1875-6 the area throughout the Presidency actually watered by the *chief* sources of irrigation (omitting minor works and ordinary rain-fed tanks) was 1,309,000 acres, paying a land assessment of Rs. 74,50,000 (74,500*l.*) But the area nominally watered by the same sources of irrigation is 1,465,000 acres, assessed at Rs. 81,01,000 (810,100*l.*) It thus appears than an area amounting to 156,000 acres, assessed at Rs. 651,000 (65,100*l.*), ought to have been under irrigation, but was neither occupied nor irrigated, and the land assessment was by consequence lost to the public revenues. Now it would be both rash and incorrect to assert that every [illegible] of this large area would be irrigated and cultivated [illegible] of the 6½ lacs (65,000*l.*) of [illegible] and every rupee [illegible] land assessment added to the revenue [illegible] a sound system, and with thorough economy in the distribution of the water. But the fact remains that all minor irrigation works are excluded from the foregoing statement, and only the chief sources of irrigation are considered. The reader may be left to draw his own conclusions. One thing may be regarded as certain, namely, that the present waste in the distribution of water from our *chief* irrigation works alone involves an annual loss to the State revenue, amounting to lacs of rupees or tens of thousands of pounds, and that for every rupee lost to the State from two to three are lost to the native farmer, and by consequence to the general wealth of the country.

A word of explanation is needed as to the omission of two of the richest districts of the Madras Presidency, Godavery and Kistna, from the foregoing comparison. The splendid irrigation-works of these two districts are comparatively recent, and in 1875–6 watered from the principal works an area of only 405,000 acres out of 927,000 acres which they are capable of supplying. The comparatively small area actually under irrigation is due, not to waste or want of water, but rather to undeveloped industry and agriculture. To have included these districts in the comparison, therefore, would have been only to mislead.

With regard to the losses accruing to the native farmers from the waste of water, figures are fortunately available to show what the *minimum* of such losses must be. As already remarked, the land assessment is not remitted by Government when irrigated lands are left uncultivated owing to causes within the farmer's control. That is to say, if the water-supply was abundant, but was wasted in distribution, the land assessment is levied as usual. The extent left uncultivated by the ryots owing to other causes than this is so trifling that it may be disregarded. Now in 1875–6 the area of irrigated land thus left waste throughout the Presidency

* The following is a list of the sluices referred to, with the sizes of the old apertures and the area irrigated by each. Fractions of acres are omitted. The facts are striking enough. The smallest plot is only two acres in extent, and had a sluice-vent a foot high by a foot and a half broad to irrigate it. The largest vent was a foot and a half high by two feet three inches broad, and irrigates only 12 acres. The twenty-fifth sluice at the first reservoir or tank happens to be 14 inches square, and it irrigates 204 acres. As 14 inches square is the average size of the apertures of the preceding 19 sluices, multiplying 19 by 204, we get 3,876 acres as the area capable of irrigation. The result is, of course, true only on the supposition that there is a flow of water in the channel to correspond.

| No. of sluice. | Size of old aperture. | Area irrigated. | No. of sluice. | Size of old aperture. | Area irrigated. |
|---|---|---|---|---|---|
| | Inches. | Acres. | | Inches. | Acres. |
| 1 | 12 × 15 | 8 | 12 | 10 × 7 | 7 |
| 2 | 18 × 18 | 11 | 13 | 12 × 21 | 5 |
| 3 | 12 × 15 | 10 | 14 | 9 × 9 | 4 |
| 4 | open. | 8 | 15 | 10 × 10 | 3 |
| 5 | 12 × 18 | 2 | 16 | 15 × 15 | 5 |
| 6 | 12 × 12 | 15 | 17 | 18 × 21 | 12 |
| 7 | 12 × 18 | 18 | 18 | 12 × 15 | 6 |
| 8 | 12 × 12 | 3 | 19 | 13 × 18 | 12 |
| 9 | 13 × 15 | 33 | | | 183 |
| 10 | 10 × 18 | 14 | | | |
| 11 | 18 × 27 | 12 | | | |

was 136,000 acres, but the assessment thereon, amounting to Rs. 5,78,000 (57,800*l.*), was collected. Now we know that if a rice crop be raised the farmer's profit is, at current prices, at least twice the amount of the land assessment he has to pay to Government. The *minimum* loss then to the community through waste of water for irrigation in 1875–6 must have been the amount by which the farmers were out of pocket, without any return, namely, Rs. 5,78,000 (57,800*l.*), together with an additional sum of twice that amount, which they would have realized as income and profit, if crops had been grown; or in all Rs. 17,34,000 (173,400*l.*). This, then, was the *minimum* loss to the community from waste of water in 1875–6.

But the actual loss was far greater. The irrigated lands left uncultivated owing to causes beyond the farmer's control amounted to 240,000 acres, and the assessment thereon, Rs. 10,52,000 (105,200*l.*), was remitted by Government. In addition to this a sum of Rs. 11,90,000 (119,000*l.*) was remitted by Government on account of short produce, withered crops, and other causes arising entirely from deficiency of water. Altogether Rs. 22,42,000 (224,200*l.*) were remitted by Government on irrigated land under occupation, owing to want of water. Much of this loss was no doubt unavoidable and resulted from failure of local rains, but a large sum, difficult to estimate, but certainly reaching to some tens of thousands of pounds, would undoubtedly have been saved to the public revenue, and a sum more than twice as great to the wealth of the country, under an efficient and economical distribution of water from all the State irrigation works throughout the country.

## Chapter III.

### *Legal Position of Government as to Distribution of Water for Irrigation.*

The apparent supineness of both the great administrative departments, Revenue and Public Works, in effectually checking the wasteful habits of the ryots, and regulating the discharge of sluices by reference to the area to be irrigated, is further explained by their ignorance in many cases of the legal aspects of the question, of the actual rights of Government, and of the measures they are entitled and bound to take to protect the interests both of the public and of the State. It would be an advantage if the administrative heads of the two great departments would make a point of giving to public officers full information on this important [redacted] any decision affecting it [redacted] matter, when [redacted] is given by the High Court. The B[redacted] Revenue in particular have in their Standing Orders an excellent medium for making known the state of the law and the course that should be adopted by district officers. There is no doubt that the interests of the Government and of the community are at times injured, because officers, being doubtful about the law, hesitate to put down a public evil lest they should find themselves defendants in a legal suit. It may be useful here to refer to the two important decisions of the Madras High Court which declare the law as to the rights of Government in the distribution of water.

The first of these cases is given at length in Madras High Court Reports, Vol. V., 1869–70, p. 6. The plaintiff in this case was a Zemindar, and the result of the appeal was the declaration that with regard to proprietary land, such as Zemindari estates, the Government has no right to limit or modify the regular supply of water through an artificial channel irrigating such land.

"Regular Appeal No. 122 of 1868.

"Ponnasimi Tevar, Appellant (Plaintiff). The Collector of Madura and 25 others, Respondents (Defendants).

"The Plaintiff brought a suit to establish his right to an uninterrupted flow of water through a channel which ran into a tank in a village which was the plaintiff's property, and to compel the removal of sluices erected across the said channel by the 1st defendant's predecessor in office, and used for the purpose of diverting the flow of water.

"*Held*, that acquiescence in the sense of mere submission to the interruption of the enjoyment does not destroy or impair an easement. To be effectual for that purpose, it must be attributable to an intention on the part of the owner to abandon the benefit before enjoyed.

"*Held* also, that the diversion of the water was a continning injury down to the time of the institution of the suit, and that the plaintiff's suit was not barred.

"*Held* also, that it must appear from the circumstances in evidence in each case that the interference or obstruction complained of is not a trivial but a substantial injury, in order to warrant relief by way of injunction.

"*Held* also, that the right to an easement in the flow of water through an artificial water-course is as valid against the Government as it is against a private owner of land.

* * * * *

"The result is that the decree of the Civil Court must be reversed and a decree passed declaring the right of the plaintiff, and prohibiting the obstruction of the flow of the water . . . and the diversion of any portion of it. . ."

The second case is given in the Madras High Court Reports, Vol. VII., 1871–4, p. 60. As in the former case it is laid down that the Government cannot interfere to regulate the customary supply of water to Zemindari lands, so in the present case it is declared with equal distinctness that the Government have full power to do so with respect to ryotwari lands. In ryotwari lands the Government are "landlords," the ryots, as Mr. Justice Kernan said, "are tenants from year to year . . . . "with a right, it is assumed, of continuous occupation, "paying rent which may vary from time to time."

"Kristnayyan and 5 others—Appellants. Venkatachala Mudali and 2 others—Respondents.

"Suit to obtain an injunction to close a new channel made by the Superintending Engineer, the 2nd defendant, for the supply of water to the village of the 1st defendant.

"Civil Court dismissed the suit.

"On appeal it was contended, 1st. That the plaintiffs had an absolute right to the uninterrupted flow of all the water in the Kaduvai Channel, without subtraction or diminution by the defendants, or by the Government represented by the 2nd defendant, and that any diminution though not causing loss was an invasion of their rights.

"2nd. That if they had not such absolute right, they had a right to a supply of water for the necessary purposes of irrigation and otherwise for their village, and that the possibility of loss at some future time, arising from a possible wrongful diminution of water to their detriment through the new sluice and channel, entitled them to the relief claimed.

[redacted]

Upon the first point *Held*. That the plaintiffs had not the exclusive right to the water contended for by them, but that their right was limited to the beneficial enjoyment of the water for the irrigation and other necessary purposes of their tenancies as heretofore enjoyed. Also that the Government, as proprietor of the Kaduvai Channel and water in it, had, subject to the above limited use by the plaintiffs and other villages in the same position as the plaintiffs', a right to distribute the water of Kaduvai Channel for the benefit of the public.

"Upon the second point *Held*. That no ground existed for granting an injunction, as no right of the plaintiffs had been invaded, no damage had accrued, and no case of prospective damage had been made out.

"Ponnooswami Tevar *v.* Collector of Madura, 5 M. H. C. R. 6, distinguished.

"*Innes, J.*— . . "What plaintiffs really claim, as was admitted at the hearing of the appeal, is an easement to the uninterrupted flow of water by the artificial channel called the Kaduvai. The Government, the common landlord of plaintiffs and 1st defendant, alters the distribution of water in a manner which plaintiffs consider prejudicial to them; plaintiffs step in and claim a right to the continuance of the old mode of distribution.

"It is elementary law that an easement cannot be claimed in respect of a tenement, but by the owner of that tenement, and plaintiffs are in no sense owners of the village lands or of any portion of the village lands in respect of which they claim this right. The plaintiffs are tenants from year to year; and though custom or contract may practically attach to each several tenancy the incidents of a permanent holding, defeasible only for non-payment of the assessment which may from time to time be imposed, they have nothing approaching to an absolute estate of the land. Now, an easement implies an absolute outright grant to some person of an incorporeal right appurtenant to his corporeal property. Such a grant cannot be conceived as made to a tenant

in respect of a tenement in which his interest is precarious. A grant of this kind therefore cannot in such a case be implied, or in other words there can be no easement claimed by a tenant as against his landlords. But there is nothing in the nature of the plaintiffs' relations with the Government to prevent their possessing, as tenants, rights limited by the duration of their interest in the land. Such rights, however, must arise either by the express contract of letting or by implication from that contract. The question therefore now presents itself whether the plaintiffs under their several contracts of letting can claim a right to prevent any diversion of the water of the Kaduvai channel for the use of the ryots of other villages. In letting irrigable land with existing conveniences for the supply of water for the purposes of irrigation, the landlord no doubt impliedly engages, if nothing to the contrary is expressed, that the existing arrangements for the supply of water will not be interfered with to the prejudice of the tenant during the continuance of the tenancy; and as the plaintiffs' tenancies are from year to year, it may be taken that this engagement is yearly renewed. But I do not think that anything beyond this can be implied from the nature of the tenancy. The case reported in 5 M. H. C. R. 6 [the previous case quoted above] . . . has no analogy to this. That was a case in which the plaintiff was the proprietor of the tenement in respect of which he claimed the easement, and was therefore in a position to claim it, which the plaintiffs are not. That case therefore may be dismissed from consideration. Limiting plaintiffs' right to this, that they are entitled to demand in respect of their several tenancies that no new arrangement for the distribution of water shall be made to their prejudice during their tenancies; and applying this proposition to the admitted facts of the case; are the plaintiffs entitled to the relief prayed? The Government, whom the second defendant represents, has the undoubted right to regulate the distribution of water supplied to its ryotwari villages. . . . . So far as appears, therefore, there is no reason for apprehending any breach of their contract on the part of Government. In what they have done, they have merely acted in accordance with their rights as landlord, and with their duty as guardian of the interests of the community. . . . ."

## CHAPTER IV.

### *Remedies—Conditions of Communal Labour.*

The remedies necessary to ensure the efficient administration of our Irrigation works are mainly two.

First.—To enforce, systematize, and extend the old customary common labour (Kudi-maramat) or an equivalent for it.

Second.—To secure an effective control over the distribution of the water under conditions that will as far as possible have regard to the various interests, both public and private that are concerned.

### *Conditions of Communal Labour.*

Communal Labour for common objects has existed in India from time immemorial. The social, administrative, and political unit has always been the village community. The members of the village community, under the guidance of their headmen, were accustomed from the earliest times to unite in common effort to effect arrangements for their own welfare and to carry out the orders of the ruling power. In the early days of British rule, as under the native Governments, the land assessment was due and was paid by the village as a whole, and not by the ryots as individual payments to the State. At the commencement of our rule it was hoped and expected that all irrigation works would eventually be maintained by the village communities concerned without cost to the State, although from the first it was clear that State funds must be advanced on loan to put them into a satisfactory condition to begin with.

But even at the beginning of the century, Colonel, afterwards Sir Thomas Munro, discerned the futility of leaving the irrigation works entirely in the hands of the natives. In a letter from the Madras Government, dated 28th October 1808, to the Court of Directors, mention is made of a plan "proposed by Lieut.-Colonel Munro," "suggesting among other things that "the repair "of tanks not rendered private property should be "made by Government." The proposal does not seem to have found favour, for, on the 29th February 1812, the Government of Madras report to the Court of Directors a plan of Settlement, which "provides for the continuance in the first instance, if necessary, of limited "advances of tuccavy (money loans) by Government "for the expense of repairing the larger tanks, and for "occasional remissions which extraordinary calamities "may render requisite. . . . . The necessity for "granting occasional remissions and for expenses of "tuccavy (money loans) and tank repairs which may "for some time be requisite, will diminish by degrees in "proportion to the gradual improvement of the country, "and ultimately will entirely cease. These are not "speculative views," &c., &c. (p. 520, Vol. I. *Selections of papers from the records of the East India Office.*)

On the 28th January 1813 the Board of Revenue wrote:—

"It may be proper to observe that under the Settlement now in progress with the actual landholders it is not contemplated that the aid of Government in the execution of repairs can be wholly withdrawn; but, on the other hand, whatever disbursements may be made having for their object the *extension of agriculture* will be made under engagements which shall secure to Government either full reimbursement of the expense, or participation in the improvement by a reasonable proportionate advance in the assessment."

In a note it is said that the preservation and repair of the more considerable tanks and water-courses must still be left with the Collectors, more particularly in Tanjore.

The Court of Directors, in a letter to the Madras Government dated 17th December 1813 (page 509), remark:—

"The ruinous state of the tanks and water-courses in this province (North Arcot) has, we trust, before now engaged your serious attention. Whatever engagements the renters may have come under, it cannot be expected that they will execute the necessary repairs with only a three years' interest in the land, supposing even that they possessed capital to disburse on such an object, which from their general poverty can hardly be the case. The expense therefore must *in the first instance* be incurred by Government, and we look for indemnity in the more favourable terms of a future settlement."

It will be seen hereafter that this hope has never been realized in the "future settlements." It should specially be noted that the anticipated expenditure was to put the tanks, &c., into good order to begin with, and the tenor of all the passages quoted, except Sir Thomas Munro's proposal, is that, when once put into good order by Government, they should be kept so by the people themselves. The latter expectation has in the main been completely disappointed; the people have not maintained the various irrigation works in an efficient condition, and the Department of Public Works annually expends large sums from Imperial Funds upon the upkeep and repair of those very works which it was originally hoped would be properly maintained by the people themselves. The expenditure in the Public Works Department for 1878–9 in the Madras Presidency on Irrigation repairs alone was estimated at Rs. 15,50,000 (155,000*l.*). Besides this, establishment cost Rs. 7,79,000 (77,900*l.*), and tools and plant Rs. 1,57,000 (15,700*l.*). This is independent of an expenditure of Rs. 766,000 (76,600*l.*) on original works.

But the Communal labour, though it has languished almost everywhere, and is in many places almost in a state of suspended animation, has never completely died out, and exists in various forms and various degrees in different parts of the Madras Presidency. It has on the whole become most lethargic in those places and upon those works, such as rain-fed reservoirs, where only a trifling expenditure of labour is regularly needed, and where the results of neglect are not immediately felt. It flourishes with the greatest activity upon works such as temporary dams in river beds, and river-fed irrigation channels, where the expenditure of time, money, and labour is greatest, and where the neglect of common duties is immediately followed by common loss or common ruin.

The pages of the Reports of the Public Works Commission in 1869 contain abundant evidence supporting the view here taken. The comparative neglect of the rain-fed tanks by the ryots is dwelt upon by witnesses from all parts of the Presidency, and there is a similar concurrence of testimony that it is upon river-channels that such communal labour as still exists is chiefly spent. The extent to which this labour is given varies greatly even in different parts of the same district. In the south of the District of Coimbatore there are channels where nearly Rs. 2 per acre on the irrigated area is voluntarily collected and spent by the ryots. A voluntary cess of 4

annas (sixpence) per acre, amounting to about Rs. 4,000 (400*l.*) per annum, is levied to pay for the channel overseers and watchmen on two important channels fed by the river Bhowani. On the other hand, the communal labour expended on the numerous channels and tanks supplied by the river Noyel is practically nothing.

On the whole, the greatest amounts, though not the highest rates, are collected and expended in the districts of Tanjore and Trichinopoly. At the enquiry of the Public Works Commission in 1869, four wealthy farmers holding lands in three different Taluks or sub-divisions of the Tanjore District gave the following lists of 14 items of communal labour (Kudi-maramat), which, as they said, "is not exacted from us by the authorities, but "we undertake it of our own accord."

*Within the boundaries of the village.*

1. Clearing large irrigating channels.
2. Clearing branch channels.
3. Clearing minor channels.
4. Clearing channels connecting the irrigating with the drainage channels.
5. Clearing the drainage channels.
6. Embanking or repairing the embankment round the village boundary.
7. Embanking the Kattaleis or blocks of fields.
8. Embanking the fields.
9. Embanking and repairing the small ponds used as seed beds.
10. Preparing the fields by digging pits in them, to remove accumulated soil, and levelling them properly.
11. Repair and erection of earthen and masonry dams and sluices in the channels through the fields.

*Beyond the boundaries of the village.*

12. Slight clearing of the irrigating channels during low freshes in the rivers.
13. Erection of earthen dams in the rivers at the heads of the channels.
14. Clearing the channels when the banks are injured by freshes.

The actual money value of the communal labour thus given is very difficult to estimate, seeing that most of the labourers are the farm-hands or hinds of the landholders or ryots, and work wherever their masters send them, receiving their wages in kind. A single temporary dam in the Cauvery in the Trichinopoly District was roughly estimated by the Engineer to cost Rs. 4,000 (400*l.*). The four ryots of Tanjore, above referred to, estimated the value of their communal labour at [illegible] less than one rupee per acre of the irrigated area. There are just 700,000 acres of [illegible] land in Tanjore, and this would give a total [illegible] value approaching to seven lacs of rupees (70,000*l.*) for the communal labour of that district. This would, no doubt, be an excessive estimate were it not that in the list above given are several items, such as embanking the fields, and lowering the level of fields as the silt deposits make it necessary, which are part of the regular routine work of every individual farmer, and have no claim at all to the title of communal labour. The Collector of Tanjore, Mr. G. Lee Morris, a man with exceptional knowledge of the district, roughly estimated the total value at about three lacs of rupees (30,000*l.*) for the whole district, or rather less than half a rupee per acre under river-irrigation. Taking the figures given by three of the chief native revenue officers of Tanjore as an average for the eight river-irrigated Taluks or sub-divisions of the district, the total value of communal labour comes to rather less than three lacs of rupees (30,000*l.*).

Mr. McCallum Webster showed that in the sub-division of the Coimbatore District the old grain payments for communal labour had been converted into a money payment on the acreage irrigated, which averaged Rs. 1-6 (2*s.* 9*d.*) per acre. This amounted to 18 per cent. on the assessment, but, as already stated, was levied on the acreage and not on the assessment.

But these arrangements, which make an excellent show on paper, are apt to fail egregiously in practice. Everything depends on the voluntary agreement of the ryots, for there is no legal obligation to enforce the payment of a voluntary cess, and, as will presently appear, the legal obligations that do exist regarding customary communal labour are void of effect. The result in most districts is that except where the Revenue officials use all their influence to support and enforce communal labour it rapidly dies away. A single recalcitrant ryot may, by his refusal to unite for the common good, induce the rest of the village to follow his selfish example. There is no question that public officers in the present day do not take the same personal interest in utilizing this communal labour for the public good as their predecessors in former times. Many of them know little or nothing about the matter, and most leave it to the chief native revenue officer (Tahsildar) and the villagers as being a delicate subject to meddle with.

The only legal provision for the enforcement of customary labour is section 6 of Act I. of 1858, which runs as follows :—

Sec. 6.—"Whenever by local custom any work for the purpose of irrigation or drainage or connected therewith is usually executed by the joint-labour of a village community, any person bound by such custom to contribute labour to such work who neglects or refuses without reasonable cause to comply with a requisition for such customary aid made to him by the head of the village under the orders of the Tahsildar or other superior Revenue officer shall be liable to pay a sum equal to twice the value of the labour which he is bound to contribute. The amount so payable shall in case of dispute be determined summarily by a village punchayet assembled by order of the Collector through the village Munsiff, according to the rules for assembling such punchayets prescribed in Regulation V. and II. of 1816. Such amount shall be payable on demand; and on non-payment the same may be recovered by the same means by which arrears of land revenue are recoverable. All sums paid or recovered under this section shall be applicable to the expenses of any works for the purpose of irrigation or drainage executed for the benefit of the village communities to which the defaulters respectively belong."

Here the first difficulty is that legal proceedings have to be taken against each separate defaulter on each separate occasion, and practically on the motion of village officers, who, if they complained at all, would probably be accused of doing so from private enmity. The collector, burdened already with the multiplicity of his duties, both as a revenue and a magisterial officer, would bring administration to a deadlock if he devoted himself to putting the ponderous machinery of a jury (punchayet), &c., into motion against everyone who refused to give as his share a few days' labour in removing silt from a channel. But a more important objection is that when by the supineness of the village communities, or of the officers of Government, or both, the custom has fallen into desuetude the Act no longer applies. "Whenever by local custom any work "[illegible] is usually executed," and [illegible] has fallen [illegible] through and no work is ever executed, clearly no one "is bound by such custom to contribute." It is a singular feature of the centralizing tendency of our bureaucratic rule that the village communities have lost much of the power of self-rule and self-help they formerly possessed. The native jury system, the punchayet, has been rudely shaken. The decisions of such a body, if ever it sits, no longer bear the old authority, and for the upkeep of irrigation works the punchayet or native jury cannot be relied on; it has practically died out.

In this changing and changed condition of the village communities it is clearly hopeless to expect that the old machinery can again be set in motion. The old plan whereby the villagers, accepting as law the orders of their immediate superiors, settled among themselves the contributions due by each ryot towards the common duty of maintaining the irrigation of works, levied such contributions in manual labour, or grain, or materials, or money, and finally carried out the work, has decayed beyond remedy.

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## Chapter V.

*Remedies (continued).—Revival of Communal Labour.*

The Public Works Commission of 1869 recorded among the results of their enquiries; that (1) "Customary "labour has not been afforded to the extent necessary "or formerly prevailing," and (2) "The difficulty of "enforcing customary labour has increased." There was an almost unanimous concurrence of testimony in support of their proposal, which is still more urgent now than it was then, that "*customary labour* [*i.e.*, "customary communal labour] . . . should be en-"forced by legal enactment." But though most persons conversant with the subject will probably give an unhesitating assent to this conclusion, it is from this point onwards that the greatest difficulties arise, and the greatest conflict of testimony and opinion takes place.

What is the legal enactment to define and enforce? How can the varying quantity known as "customary com- "munal labour" be stereotyped in an Act? If it has languished into nonentity, how can it be recreated? If converted into a money rate, are the villagers, or the revenue authorities, or the Department of Public Works, to have the spending of the proceeds, and whichever secures the spending, will not the other two bodies protest that the money might be better laid out, and will not the villagers in particular, in all probability, have to pay the money rate, and to do a lot of communal work as well?

The following suggestions are offered in the hope that they may afford something like a practical solution of these difficulties. It must be remembered that since 1869, when the Public Works Commission sat, the difficulties attending the expenditure on district roads, sanitation, and elementary education have been solved by the Local Fund Act, introduced by Sir A. J. Arbuthnot, now a member of the Governor-General's Council.

This Act hands over all these matters, with the funds applicable to them, to be administered by district boards under suitable rules and restrictions. Whatever opinions may have been held originally as to the formation of these boards, there will probably be few, either among officials or non-officials, who would now advocate their abolition. There is probably not a single officer of the Revenue or Public Works Departments who does not know many times more of the needs and resources of his district in roads, bridges, sanitation, hospitals, dispensaries, vaccination, and elementary education, than he would have known if the Local Fund Act had never existed. This admirable legislative achievement has, in fact, created a systematic organization devoted to these useful objects throughout the Madras Presidency. It has effected two other most admirable results. It has practically united the officers of the Revenue and the Public Works Departments on all matters falling within the scope of the Local Funds Act, by submitting their different proposals and suggestions to the decision of a Local Fund Board, where both are represented. And last, but certainly not least, it has secured the presence and co-operation of non-official natives, as members of the board, in the administration of the country. It may be said that the natives vote as the president and collector wishes; but this is certainly not universally the case, for the present writer has, on more than one occasion, seen the president of a board outvoted by the native members. Even if it were otherwise, the presence of the non-official native members would be a great advantage. The topics for decision are familiar to them, and are likely to be [redacted] in favour of them are palpably weak, and the members are at liberty to express their opinions, and if they are at all encouraged, thus supplying the district officials with knowledge they would often fail to obtain through merely official channels. It is now suggested that a somewhat similar system, suitably modified, should be established by law, with the double object of enforcing and extending communal labour, and of exercising a thoroughly efficient superintendence and control over works of irrigation, including the distribution of the water.

First then, as to the enforcement and extension of communal labour. The preamble of the new Act might run, "Whereas by the ancient customs of this country, "the aid of the village communities ought to be given "towards the maintenance and repair of public works "of irrigation in which they are interested, it is enacted "as follows." Taking this as a starting point, it will be desirable first of all to fix some money standard or rate to which the communal labour can, if necessary, be converted under conditions to be described hereafter. Is this standard or money rate to be fixed at so much per acre of the irrigated area, or at so much per rupee of assessment? The road fund and village service cesses are fixed at so much per rupee of the land assessment, and this is, perhaps, desirable, as the varying rates of assessment are supposed to represent the varying values of the lands. With regard to irrigation, however, the case is different. The natives in assessing themselves for this purpose, almost universally fix their contributions at so much per acre. They say, justly enough, that the poorer lands require quite as much water as the rich, if not more, and although the richer lands are generally nearer the source and more certain of irrigation, yet, if the owner paid a larger contribution, he would certainly think he was entitled to receive a larger supply of water. The great point, however, is that the natives are accustomed to this method of taxing themselves, and if the tax is to be enforced by law, no change of system should be made without the strongest reasons in its favour.

The facts already stated may be taken as a guide to the rate per acre at which the cess should, when necessary, be levied. The four native farmers of Tanjore examined by the Public Works Commission in 1869, explained that they paid nearly a rupee an acre on communal labour, and in Coimbatore, the average rate at which the ryots converted the communal labour into money was Rs. 1-6-0 (2*s.* 9*d.*) per acre. It might be provided then, that the communal labour to be required of the community on any work of irrigation shall not, when estimated in money, exceed annually the sum of one rupee per acre of the irrigated area, except under the following conditions:

(*a.*) If the communal labour usually expended on any irrigation work at the time of the passing of the Act exceeds in value of labour or in money, the sum of one rupee per acre, then such sum shall thenceforth be regarded as the amount of communal labour which may be required of the community.

(*b.*) If the landholders of half the area under any irrigation work shall desire to contribute in communal labour a greater sum in money or labour than one rupee per acre, then such sum as may be agreed upon by them shall be the amount of communal labour required from the landholders of the whole area irrigated.

Before proceeding to discuss the conditions under which the whole or any part of such a communal labour cess should be collected, it will be advisable to show that the total value of land assessment, *plus* communal labour, paid by the landholders, would not in any case reach the value of the half net produce, which is the share claimed by Government out of the yield of the soil. To show this, it will be necessary to refer to the data and calculations of the Settlement Department. This will be done as briefly as possible, and with this view reference will be made only to the best and the worst classes of land, paying the highest and the lowest assessment respectively. As the settlement rates fall in regular gradations from the highest for the best land [redacted] to the lowest for the worst land, the same [redacted] applicable throughout.

Taking the settlement data of the Coimbatore district as prepared after actual experiments, we find the gross yield of the best irrigated land to average above 1,200 Madras measures, or 50 Imperial bushels, of unhusked rice. The gross yield of the poorest irrigated land is 300 measures, or 12½ Imperial bushels per acre. To ascertain the Government share, which is half the *net* produce, the yield is converted into a money equivalent at a fixed rate. The commutation rate fixed in this case was the average market price for 20 years ending with 1865. As a great rise in prices has taken place during the last 10 or 15 years, it is evident the gross value of the outturn must be greatly underrated. Below are given the results of calculating the Government share of the produce, (1) on the average of prices from 1845 to 1865, (2) on the average of 1855 to 1865, and (3) on the average of 1865 to 1875, the year before the famine. The average value from 1845 to 1865 was Rs. 126 per garce,* or 25 Madras measures (75 lbs.) per rupee of unhusked rice. The average from 1855 to 1865 was Rs. 168 per garce, or 19 Madras measures (57 lbs.) per rupee. The average from 1865 to 1875 was Rs. 212 per garce, or 15 Madras measures (45 lbs.) per rupee. The following figures show how the value of the Government share, or half net produce, is arrived at for each rate:—

* 1 Garce = 3,200 Madras Measures. 1 Madras Measure = 93·75 cubic inches.

*Statement showing value of Government Share of produce in unhusked Rice.*

| Unhusked Rice per garce of 3,200 Madras measures. | Value. | Deduct $\frac{1}{5}$th for vicissitudes of season. | Remaining gross value. | Deduct cultivation expenses. | Net value. | Government share. | Actual Government tax or assessment. |
|---|---|---|---|---|---|---|---|
| *Best Soil.* | RS. A. P. | RS. A. P. | RS. A. P. | RS. A. P. | RS. A. P. | RS. A. P. | RS. |
| Value of 1,200 measures or 50 bushels at 126 Rs. per garce | 47 4 0 | 9 7 2 | 37 12 10 | 13 2 10 | 24 10 0 | 12 5 0 | |
| 168 Rs. per garce | 63 0 0 | 12 9 7 | 50 6 5 | 15 9 1 | 34 13 4 | 17 6 8 | 12 |
| 212 do. do. | 79 8 0 | 15 14 5 | 63 9 7 | 18 1 2 | 45 8 5 | 22 12 2 | |
| *Worst Soil.* | | | | | | | |
| Value of 300 measures or $12\frac{1}{2}$ bushels at 126 Rs. per garce | 11 13 0 | — | 11 13 0 | 4 12 10 | 7 0 2 | 3 8 1 | |
| 168 do. do. | 15 12 0 | — | 15 12 0 | 5 11 9 | 10 0 3 | 5 0 1 | $2\frac{1}{3}$ |
| 212 do. do. | 19 14 3 | — | 19 14 3 | 6 11 5 | 13 2 10 | 6 9 5 | |

Here it is clearly shown, and the statement cannot be controverted, that if the Government share of the produce were commuted into money at the average market prices of 1865 to 1875, *before* the great rise of prices caused by the famine of 1876, the Government tax or assessment on the best irrigated land would be nearly Rs. 23 per acre, and on the worst irrigated land Rs. $6\frac{1}{2}$ per acre. Instead of this the average rate has been so fixed that only Rs. 12 per acre is levied under the new settlement on the best land, and only Rs. $2\frac{1}{3}$ on the worst. The land assessment is, in fact, calculated on the datum of a market value, to which prices will never again fall. On the best lands too, it will be observed that 20 per cent. is deducted on account of possible vicissitudes of season. Thus the undeniable fact is that the Government are treating the ryots with such leniency that both on the best and on the worst land they levy less than half the amount which is their recognised share of the produce. It is unnecessary to repeat the same proof for the gradations of assessment levied on the various classes of soils. The assessment imposed on these is based upon actual experiment, and is calculated [redacted]ame way. It is obvious then that there is [redacted] margin between the land assessment, which [redacted] Government *might* demand, and that which actually [redacted] demanded, to allow all ryots or landholders to provide the full amount of communal labour here suggested.

Englishmen interested in India, having got rid of the idea that India is a very rich country, are now in danger of falling into the equally mischievous error that all inhabitants of India are equally poor. Taking the agricultural population of the Madras Presidency generally (excluding the people on the West Coast), there is a broad line of division between the thoroughly prosperous and well-to-do, and those who are but little removed from poverty. To the former class belong those who hold permanently irrigated land; that is, land which is to all human calculation secure of water-supply from channels, reservoirs, or wells. To the latter belong, in varying gradations, the far larger class of *all who do not*. The first class, however, includes a most important and extensive section of the population, including the majority of the landholders of the irrigated tracts in Godavery, Kistna, Trichinopoly, Tanjore, much of Coimbatore, of Tinnevelly, of Madura, and of other districts.

The area thus certain of irrigation and permanently protected against drought throughout the Presidency is estimated by the Board of Revenue to exceed two million acres. The land assessment payable to Government on this area is about 110 lacs of rupees (1,100,000*l.*). In enforcing what might be called "the communal labour "cess," there would be no hardship requiring the maximum amount from the ryots of those lands that are secure of water and of crop.

But in the newly irrigated delta tracts of the Godavery and the Kistna, where the distribution of the water is efficient, and where, moreover, the water-rate is not a consolidated charge upon the land, but is charged at so much per acre as the water is used, it is probable that the present scheme would be inapplicable, at all events, without important modifications. Deducting, then, half a million of acres on account of the newly irrigated delta lands of these two districts, there remain a million and a half of acres on which the full amount of communal labour would be demanded. The communal labour on this area, at the value of R. 1 per acre, would be worth 15 lacs of rupees (150,000*l.*) per annum. With such aid as this, it would not be too much to anticipate that the public irrigation works would be maintained in a state of the highest efficiency, and that a perceptible diminution of the State expenditure on minor repairs might be expected. A larger expenditure of State funds could then be made to put inferior irrigation works into an efficient condition.

The lands less certain of irrigation amount to a million and a half of acres, assessed at 70 lacs of rupees (100,000*l.*). If half the amount of communal labour required for the permanently irrigated lands were required for these inferior, we should further have labour worth Rs. 7,50,000 (75,000*l.*) per annum expended annually, for [redacted] part on rain-fed tanks which are [redacted] by the people.

[redacted] but the landholders themselves [redacted] mend the imposition of a higher [redacted] There are many cases where the villagers have offered to subscribe considerable sums for the execution of works in which they were interested, but there was usually the request, sometimes the condition, that it must be distributed rateably over the irrigated area, and be collected by the Government officers in the same way as the State revenue. An intelligent community is often anxious to carry out some favourite scheme of improvement, but a single recalcitrant objector can often put a stop to it all. If he will not subscribe, neither will they, and so the scheme falls through. During the settlement of the Tinnevelly District, more than $2\frac{1}{2}$ lacs of rupees (25,000*l.*) were raised by subscription and by the sale of waste lands, and expended upon objects of public utility, chiefly irrigation works. On one channel alone the ryots built 46 substantial masonry sluices, in lieu of more than a hundred hollow palmyra trunks which had been used as sluices, to the great damage of the channel bank, and to the detriment of the lands at the end of the channel. The channel in question irrigates only 650 acres, and receives an ample supply of water from the first weir over the Tambrapurni river, but the drain of water through the rude wooden escape-pipes was so great that the supply for the lands at the end of the channel was insufficient. In another village the residents built 26 new masonry sluices. In another part of the same district, above Rs. 40,000 (4,000*l.*) were subscribed by the ryots, and expended upon a new head sluice and channel in connexion with the irrigation work known as the Strivaigundam weir or anicut. In another village, above Rs. 1,000 (100*l.*) were subscribed by the ryots, and expended in clearing away accumulations of silt from neglected public channels. Four villages united to subscribe Rs. 2,500 (250*l.*) to build regulating works to apportion the water supply, and thus settle an ancient feud. Many similar cases could be mentioned. Indeed so numerous

were the applications from village communities desirous of raising subscriptions for works of public utility in which they were individually interested, that the authorities were unable to pay attention to them all.

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## Chapter VI.

*Remedies (continued)—Up-keep and Control of Irrigation Works.—Irrigation Boards.*

*Up-keep and Control of Irrigation Works.*—In arranging for the detailed and systematic employment of communal labour upon the repair and maintenance of irrigation works, the guiding principle must he decentralisation. Local works to be maintained by local means must be supervised by local knowledge and personal interest. The people who contribute either communal labour or an equivalent cess are the very persons who are most interested in seeing it properly expended. The Collector in charge of a district will have a general interest in all the irrigation works in it, but his *personal* interest will be centred in those he happens to have seen. So with the Superintending Engineer of several districts. How then can we secure the personal interest needed for the work in view? No single official will have time enough or knowledge enough for the detailed work of a whole district, thousands of square miles in extent, containing perhaps more than a thousand rain-fed tanks, and a hundred or so of river-fed channels. His interest will be both meagre and scattered.

The most effected system will, it is suggested, be found to lie in the establishment of "*Taluk Irrigation Boards.*" In every taluk there should be an irrigation board, comprising, as members, the Engineer of the Range, the chief native Revenue officer, called the Tahsildar, and his immediate European superior, and a few other district officials; and together with these an equal or greater number of landholders or ryots interested in the different irrigation works of the taluk or in as many of them as possible. The Collector should be *ex officio* President, and the Superintending or District Engineer should be a member of all the Boards. Each separate irrigation channel, and every important rain-fed reservoir should have a non-official native representative on the Board, and all large irrigation channels should have several. Special care should be taken to secure a representative from the last village irrigated by the channel, where all waste of water in irrigating the villages above would be immediately felt. It would be the duty of every Board, at the outset to acquire trustworthy plans and lists showing the course of every irrigation channel in the taluk, and details regarding every bank, cut, sluice, waste-weir, and other masonry work, both for channels and reservoirs, together with full information of the area to be irrigated by each separate sluice. As already observed, there is probably not a single district in the Madras Presidency where this essential information is now in existence. Such ignorance does not redound to the credit of our administration, and is of itself sufficient to indicate the need for some such reforms as are now proposed.

The collection of the needful information proposed would be a work of time, particularly where professional skill was required to obtain it. But a beginning could be made at once, and much valuable knowledge secured without difficulty. In all surveyed districts there are maps on a scale of 16 inches to the mile, and the first obstacle, that of securing sketches and maps, is thus removed as far as surveyed districts are concerned. All irrigated land would be entered in one of two classes, according to the certainty or otherwise of the irrigation. Remission of assessment on account of scarcity and failure of water at any time during five years might qualify for entering lands under the latter head.

The Irrigation Board would proceed to ascertain the amount of communal labour devoted to each irrigation work by the village communities interested; and in every case, where the amount, as estimated by the Irrigation Board, was of less value than one rupee per acre for permanently irrigated land, and half a rupee for the rest, they would call upon the village communities through their headmen to make good the amount upon repairs, conservancy establishment, and such other work as the Board directed. If any community failed to obey the order thus given, the Irrigation Board would proceed to levy annually the money equivalent of the additional communal labour so required to make up the legal quota, and to expend the amount under their own orders, either through the engineer or through other agency, on the irrigation work concerned. This is the essential feature of the whole scheme now under elaboration.

The Board might entrust the work to the villagers for payment, or not, according to circumstances. The overseers, watchmen, and other establishment maintained by communal contributions, or by money equivalents, would be amenable to the orders of the Irrigation Board, and their appointment and dismissal would rest with the Board subject to the President's confirmation. The cess would be collected in the same way as the land revenue. A small percentage of the total value of the communal labour would have to be levied in money to meet the contingent expenses of the Board, salary of one or more clerks and overseers, &c., &c. The emoluments arising from grants of land, deductions from the revenue, and the like, now devoted to the maintenance of channel watchmen and overseers, would continue to be applied to the same objects under the orders of the Irrigation Board. No new sluice, cut, or other work, by a landholder or farmer, would be permitted without the formal sanction of the Irrigation Board, and all alterations executed by the Public Works Department out of Imperial funds would be communicated before execution to the Board, who would be invited to express their opinion as to the works most urgently in need of attention. With the approval of the engineer, the Board should be empowered to alter, diminish, enlarge, and generally regulate the discharge from any sluice or work, consistently with the proper irrigation of the area to be supplied, and to make all arrangements connected with the distribution of the water for the benefit of the community. They would make annual allotments estimated in money for the removal of silt, sand, and vegetation from channel beds, for repairs to masonry, and for all similar needful work. The work would be carried out by the villagers or by the Board in the manner already indicated.

In the case of channels wholly or partially irrigating zemindari or proprietary estates, it would be advisable to have a representative of the zemindar or proprietor on the Board, and to provide that in case of dispute as to the distribution of water to such proprietary lands, a jury should be appointed, nominated by the President of the Board on the one hand, and by the zemindar or proprietor on the other. The basis of decision should be that the works for distribution of water should allow, when water was available, a liberal quantity for the area registered as irrigated in the zemindari or proprietary estate at the time of the passing of the Act. This amount might be taken at 50 or 100 per cent. more than the quantity estimated as actually required to raise a crop of rice, or say* 6 cubic yards per acre per hour. This, however, is a question requiring examination and professional engineering knowledge. The Irrigation Board would act upon the report of the jury, and no suit should lie against them except upon the matter of fact above noted.

Similar provision might be made for other proprietary lands, such as "inams." With regard to ryotwari lands, the holders of which are tenants of Government, it has already been decided by the High Court in the second case already quoted (p. 26) that the Government has full power to regulate the distribution of water for irrigation for the public benefit. The Act might provide that no suit should lie against the Board for any reasonable orders carried out by them for the proper regulation and distribution of water for the irrigation of such lands. In the form in which it is now proposed to enforce communal labour, it will be unnecessary to specify the details of it, except in so far as the value of the communal labour given by the community must be estimated. The list given by the four Tanjore farmers previously quoted (p. 32) may be taken for this purpose, omitting such items as embanking fields, and lowering their level, which are personal and not communal obligations. The repair of weirs, sluices, and other works, of reservoir embankments, and of the supply channels thereof, might also be added. Everything connected with the repair and maintenance of irrigation works *might* thus fall within the limits of communal labour, but it is obvious that the chief expenditure of such labour would fall upon the constantly recurring needs in the way of removing silt, sand, and weeds, strengthening and repairing banks, &c., &c.

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* A Taluk is a Sub-division of a district. Each district contains from 6 to 12 Taluks.

* 3 cubic yards per acre per hour for irrigation is estimated by the Madras Engineers to be "more than ample with a constant supply, but "with an intermittent supply it would probably be requisite sometimes "to give more."

The village communities concerned should be held primarily responsible for the safe custody of the irrigation works affecting them, just as they are now held responsible under Act XXVIII. of 1860 (S. 9) for the safety of boundary stones erected by Government. In the case of wilful damage to a sluice, weir, channel, or other irrigation work, it should be provided by law that a penalty of twice the cost of repairing such damage should be leviable from the holders of the land irrigated by any work thus damaged, or profiting by the injury of such work. The penalty should be independent of the criminal prosecution to which the actual perpetrators, if discovered, would be liable. The Taluk Irrigation Boards would meet once a month or as often as might be necessary, and a report of their proceedings would be published in the *District Gazette*. They would submit an annual report of all communal work executed, with detailed accounts of all sums of money collected and disbursed under the Act. Great care would be necessary to prevent the proceeds of the cess from being swallowed up by costly establishments, instead of being spent on the actual improvement of the works. The provisions of Act I. of 1858 (Customary Labour) for works of sudden emergency and danger might be left practically unaltered. Where two or more taluks are under the same irrigation work, as in Tanjore, it would be open to the President to unite the Irrigation Boards of such taluks for one or more meetings as might be necessary. The Government would reserve power to exempt any district or specified work of irrigation from [illegible] of the Act. But [illegible] the value of the communal labour would then be lost to Government and to the works, this reservation would probably be sparingly exercised. With the checks on the Irrigation Boards already noted, requiring the concurrence of the engineer before action is taken, there would probably be little difficulty in applying the system throughout the greater part of the Presidency.

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## Chapter VII.

### *Summary.*

To summarise the contents of the preceding chapters. It has been shown that the administration of the old Irrigation Works of the Madras Presidency is, generally, and allowing for exceptions, in a condition far removed from thorough efficiency. The causes of this inefficiency are chiefly four :—

1.—The division of responsibility and authority with [illegible] regard to the repair and maintenance of the irrigation works and the distribution of the water, between the Revenue Department and that of Public Works.

2.—The neglect and abandonment by the village communities of the immemorial duty of communal labour.

3.—The inability of the officers of Government to enforce the rules they are legally entitled and bound to make for the careful distribution of water for irrigation.

4.—The irregularity and uncertainty of the State allotments for the repairs of irrigation works.

The results of this inefficient administration are—

I.—The gradual deterioration of many important works of irrigation through increasing waste of water; and of a far greater number of minor works both through waste of water and through want of the communal labour that should be given for repairs.

II.—There is a loss to the public revenues, which must be estimated at tens of thousands of pounds yearly, not only on account of lands that could be irrigated and are not, but also on account of lands imperfectly irrigated through waste of water, the assessment of which has to be remitted and cancelled. In 1875–6, there were 156,000 acres assessed at Rs. 6,51,000 (65,100*l.*) nominally supplied by the chief sources of irrigation alone (not including the great delta works of the Godavery and the Kistna), which were neither occupied nor irrigated. In addition to this, Rs. 10,52,000 (105,200*l.*) were remitted on account of 240,000 acres under all sources left uncultivated by the ryots for want of water. A further sum of Rs. 11,90,000 (119,000*l.*) was remitted by Government on account of withered crops, short produce, &c., on an unknown area, all due to deficiency of water.

III.—Whatever may be the loss to the public revenue, the loss to the wealth of the community must be from two to three times as great. To the losses already indicated by the foregoing figures must be added the loss of crop on 136,000 acres left uncultivated for which water would have been available if the ryots had economized it. The assessment on this land Rs. 5,78,000 (57,800*l.*) was collected from the ryots by Government.

To effect the administrative reforms so urgently needed, it is proposed that a legislative enactment be passed with the following objects :—

(1). To revive and enforce the duty of communal labour among the village communities.

(2). To unite the [illegible] distinct and often antagonistic influences of the Revenue Department, the Public Works Department, and the village communities, by the establishment of an Irrigation Board in every taluk, on which all three bodies will be distinctly represented.

A method of enforcing the communal labour has been suggested, which has the advantage of leaving the duty in the hands of the village communities either wholly or partly, according as they may be willing and able to perform it, while such portion as may be neglected or declined is converted into a money equivalent, and expended under the orders of the Irrigation Board. The value of communal labour has been estimated by wealthy ryots of Tanjore as nearly a rupee an acre in that district, while in parts of the Coimbatore district the communal labour has been converted themselves into a cess averaging [illegible] communal labour were remitted by the ryots dency to the [illegible] required throughout the Presi- [illegible] of Rs. 1 per acre on about 1¼ million acres of land the irrigation of which is certain, and of Rs. ½ per acre on about 1¼ million acres of land, the irrigation of which is uncertain, there would be expended on the irrigation works of the Presidency, labour to the value of about 22½ lacs of rupees yearly (225,000*l.*), of which but a comparatively small quantity is now secured.

Under such a system as has been proposed, all irrigation works would, it is believed, be eventually maintained in a state of thorough efficiency. The distribution of water would gradually become economical and systematic. The public revenue would be increased by a sum that might be expected eventually to reach 100,000*l.* per annum or even more. The wealth of the community would be increased by a sum necessarily at least twice as great as the increase to the public revenue. The State allotments for repairs, at present insufficient, would become ample for all purposes, and in course of time could be materially diminished, to the sensible relief of the Imperial Exchequer.

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## SINDH.

### Professional Papers on Indian Engineering.

### No. CLVII.

**Memorandum by Colonel R. Strachey, R.E., Inspector-General of Irrigation, on the Extension of Irrigation in Sindh.—31st January 1867.**

The rainfall in Sindh is so small, that cultivation may be said to be almost impossible without the aid of irrigation in some form. The ordinary means of obtaining water for this purpose is to draw canals from the Indus. But it has been beyond the power of the people to maintain a supply of water in their canals, excepting during the season of the inundation, which corresponds to the rainy months of other parts of India, and to the agricultural khureef season. It follows that, as a rule, the cultivation of Sindh is limited to a khureef crop; and the rubbee, or cold season crop, is less than one-tenth of the whole. Further, the produce of the khureef crops is in a great measure consumed in the country, supplying the food of the population and their cattle. The more valuable cereal grains and oil seeds are the produce of the rubbee crops, and from the causes that have been mentioned, the quantity of these is very small, and under existing circumstances is not likely to be increased to any sensible extent.

The cultivation dependent on the canals may be divided into two great classes :—*First*, that which can be carried on with water naturally flowing over the sur-

face of the land, in Sindh termed *Moke*, and equivalent to *Tor* of the North-West Provinces; and *second*, that which requires the water to be artificially raised to lands, the surface of which is above the water-level of the canals, in Sindh called *Churkee*, and in the North-West *Dál*.

The moke cultivation is far less certain and less valuable than might at first sight appear likely, consequent on the almost entire absence of control over the level of the water in the canals. This level simply depends on the rise and fall of the river, and excepting in some few specially favourable cases, the risk of the cultivators in moke cultivation is very considerable, and the relative value as compared to churkee, greatly reduced.

The churkee cultivation is so called from being dependent on the use of the "churka," or Persian wheel, by which the water is lifted to the necessary level. It is probable that considerably more than one-half of the whole cultivated area is churkee land, and it is not likely that the average height to which the water has to be raised is less than five or six feet. It will be obvious that a very great expenditure of labour is requisite to lift water in this manner. Major Lambert, the Collector of Kurrachee, has got together a great number of estimates of the cost of this operation, and he reckons that it amounts, on the average of the whole province, to about Rs. 15 an acre. It is wonderful how the country can support such a burden on its agriculture. The charge on the Sindhee peasant, over half of the province, to place him in the position in which nature places the agricultural community of most countries without any cost, by means of the regular rainfall, is not less than is paid in England as the whole amount of rent.

But besides these difficulties, others of hardly less importance arise from the rude manner in which the irrigation channels have been formed in the first instance. Want of stability in the heads of the main canals; obstruction of the channels by the deposit of silt, due to irregularities of inclination, or other causes; injuries to water-courses and adjacent lands from the breaching of embanked channels, ill-designed or ill-constructed; submergence of lands by reason of the escape of water from canals, the supply in which has been in excess of the requirements for irrigation; injuries of various descriptions, arising from the Indus floods breaking into the water-courses and the irrigated lands; these are some of the more important defects to which the present system of irrigation is liable.

Till the present time, there has been hardly any application of engineering science to the improvement of this state of things, and the existing canal engineers are little more than superior overseers of the annual canal clearances, under the direction of the revenue district officers. Some improvements, not without value, have been made from time to time in the rude system of canals which existed when Sindh first became a British Province, and in the Shikarpoor Collectorate, the supply of water has been sensibly increased with a corresponding distinct increase of cultivation and revenue. But, as a whole, the condition of the country and the people must be regarded as almost stationary; and that this should be the case seems quite sufficiently explained by the adverse combination of circumstances which have been mentioned.

The irregularity of the flow of the canals, and their rude character, often leads to a wasteful use of the water in moke lands. The limitation of the quantity of water supplied by the canals, combined with the absence of rain, prevents the land recovering itself after cropping, and induces a practice of long fallows of two or three years; this leads to very slovenly husbandry, the ground being seldom properly cleared of weeds and jungle. The heavy labour attendant on the raising of the water, restricts greatly the extent of land which might, under more favourable conditions, be tilled by the existing population. The almost complete absence of a rubbee crop, although the climate and the greater part of the soil is believed to be as favourable for its production in Sindh as in the North-West Provinces, deprives the cultivator of what, under a happier arrangement of water-supply, should be to him a source of great comparative wealth and absolute prosperity. The poverty and the stationary material position of the population, and the small amount of exportable produce which comes into the markets prevent the expansion of trade, opposes the growth of Kurrachee, the port of export, and starves the railway which leads from the agricultural districts to this port.

The obvious remedy for all these evils is to be found in the substitution of perenniel, for the existing intermittent, irrigation canals, and of water delivered at the level of the surface, instead of at a level which requires that it should be lifted by animal power. If water could thus be given to the whole province (excluding, of course, those parts which are sandy desert, and naturally incapable of culture), it would be but little, if at all, inferior in productive capacity to the best districts of India; and making allowance for all the barren regions, Sindh would yet remain one of the most important provinces of the British territories.

And there is much reason to hope that such a remedy may be practically possible of application in the chief part of the culturable country. It will, of course, require very careful consideration before the needful works for carrying out such a change of system in the irrigation of the province are put in hand; and at the present moment the only essential thing is to arrive at a conclusion whether the objects to be gained by success, and the prospect of such success are of that nature which should induce the Government to take the necessary steps to order further investigation, and to determine that the requisite works should be carried out if these investigations are satisfactory.

It may be assumed that there is no further need for discussing the character of the objects to be gained; their paramount importance is self-evident.

As to the prospects of success in accomplishing the ends in view, there are two principal lights in which the matter must be considered: *First*, the engineering; and *second*, the financial. It cannot be properly said in this case that such works as are suggested are strictly necessary to protect the country from famine. There is already sufficient safeguard against this extreme evil. What is sought is to improve the position of the population by greatly increasing the facilities for agriculture. The obligation on the State to do this, unless at all events there be no attendant increase of charge put on the general finances, can, perhaps, be hardly pressed with justice to the interest of the community as a whole; and it may fairly be accepted as a criterion by which to guide our action, that the works shall be distinctly profitable to the State. This point, therefore, will call for careful examination.

[redacted] engineering question much need not be [redacted] On the engineering suffice, as *primâ facie* evidence, beyond what will [redacted] practicable. The [redacted] the scheme as a whole [redacted] plies what is virtually an unlimited quantity [redacted] and the levels of the country are known to be [redacted] will admit of the easy formation of canals having the needful requisites. Nature has happily provided many spots which appear quite suitable for permanent heads for perennial canals, without involving the construction of very difficult or expensive works. Such are Rohree and the opposite bank of the Indus at Sukkur, Sehwun, Kotree, and Jurruck. At all these places solid rock formations occur on the river's bank, and the channel has, for a very long period, remained constant at these localities. Above Sukkur no rock occurs in the river bed, but there is no reason to doubt that a permanent canal head could be kept open where there is no rock, though at what cost, and with what general financial results, must depend on circumstances now unknown. On the whole, the facilities for canal construction in Sindh are singularly great.

The question has long been discussed, whether the large quantity of silt carried in suspension by the Indus would not be a cause of such obstruction to any perennial canal as would virtually make it useless. I regard such fears as quite chimerical, but it may be desirable to state briefly my reasons for saying this. First, it is a fact that many of the existing large inundation canals remain open permanently without sensible silt deposit. Next, where silt is deposited, it may unhesitatingly be attributed to the direct operation of causes which should not come into play in properly designed canals. In the existing canals, these deposits most frequently occur either near the mouth or at the extremity. In the first of these cases, the deposit is commonly the result of the erosive action of the river on its bank near the canal mouth. The water under these circumstances becomes abnormally charged with earthy and sandy matter as it enters the canal, and, as a matter of course, much of this is dropped shortly afterwards. When the canal mouths are free from such erosive river action, and the general slope of their beds is sufficient, they remain unobstructed. The obstruction of the lower extremity of the canals is the immediate result of deficient fall, and in many cases almost total stoppage of the current of water. These defects could not exist in properly designed channels. On the whole,

the deposit of silt, wherever it occurs, is the result of irregular river action, or of irregular velocity within the canals. The result of the improved system would be to arrest the river action on its banks at the mouth of the canal, and to preserve the velocity of the water within the channels at a suitable uniform rate which should prevent the silt in suspension being deposited until it is carried out into the fields, or the very smallest of the water-courses. The increased height, at which the water-surface would be maintained in the canals, would materially assist in obtaining an improved velocity in the distributing channels; and the same result would be caused by the concentration of the supply into fewer and larger canals which would follow the suppression of some of the far too numerous cuts which have been formed in a state of society where there was no authority to exercise a proper control over the economical distribution of the water. It is the common belief that silt held in suspension is an absolute advantage to the cultivator if it can be distributed with the water over the surface of the land. If any deposit of silt should take place in the minor channels, in which the velocities are likely to be least, and the levels less under engineering control, it can be removed without sensible practical inconvenience, and with the least amount of labour.

I may here conveniently refer to a point which seems to call for special consideration in the formation of any project for improved irrigation works in Sindh. Where irrigation is introduced into a country for the first time, the arrangement of the minor distributing channels may be controlled by the engineers almost as completely as that of the chief feeding lines of canal. But in Sindh, where all cultivation at present depends on irrigation, it seems almost obligatory to make use of the existing minor channels, if not exclusively, at least to the very utmost extent that is possible. The necessity for this will be apparent when it is remembered that the whole fabric of property in land is, so to speak, built up upon the network of water-courses which supply the great essential for all cultivation. The inhabited and cultivated lands follow the lines of canal. Where the revenue settlement has been completed, it has been based on the supply of water by the existing channels. To do otherwise than continue to supply th[illegible] channels would not only call [illegible] water by [illegible] amount of labour for [illegible] for a very great [illegible] but would [illegible] the excavation of new [illegible] that would tend most seriously to disturb [illegible]ties of land and everything connected with the agriculture of the country. The aim of the engineers, therefore, should be to introduce water as early as possible, and with the least possible disturbance of the existing network of channels, on the improved system. It would be their business, at a later period, to weed out by degress all the really objectionable features of the distributing channels first forced upon them. It will, of course, be possible that, in some cases, important modifications in supply channels may be unavoidable from the first, but so far as I am able to judge, these should be exceptions to the general rule as before stated. It is my belief that the adoption of this system will in all respects be the most desirable, whether regard be had to the interests of the cultivator; of the state as superior landlord; of the exchequer in the matter of first cost and eventual speedy return; of the engineers in obtaining a proper practical knowledge of the requirements of the country for its irrigation, and a gradual but complete power of control over the supply of the water in the most thrifty manner. It is necessary to bear in mind clearly that from the very conditions of the problem, our engineers will come to the task imposed on them without a detailed practical knowledge of the exact requirements of the country in respect to water, and that their position, in the face of a population which has practised irrigation from time immemorial, is very different from what it might have been in a country into which canals were to be introduced for the first time.

The condition which for these reasons I regard as obligatory, of working the new system of irrigation through the existing distributing channels, it is almost needless to say cannot be productive of anything but saving of expense, time, and labour; and under such an arrangement, the full benefit of the improved system will be obtained by the people and the State in a far shorter time than could be reasonably expected in a country new to irrigation, and requiring to be provided with distributing channels. One of the chief causes of the slow progress of irrigation from the Ganges Canal is understood to have been the want of minor distributing channels.

Of course it is impossible to offer an opinion of any value as to the probable cost of works such as have been spoken of, without first obtaining detailed designs and estimates. But without any precise knowledge of the exact cost, some useful light may be thrown on the financial part of the discussion by considering the probable return from an improved system of irrigation, and calculating the amount of capital which it would cover.

The total area of land under crops watered by the canals maintained by the Government in Sindh, is at present about 1,200,000 acres. The average combined charge for land revenue and water is about Rs. 2-4 per acre. It will certainly be a very moderate estimate if we reckon that, under a system of high level water-supply, permanently kept up, and completely under control, an additional charge of Rs. 1 per acre might be made on land actually cropped under irrigation, raising the total charge to Rs. 3-4 per acre. In the North-Western Provinces I believe that the average charge would be as much as Rs. 4-8, and in Madras it would be never less than Rs. 5, and often more. Next it may be reckoned that for the khureef crop in Sindh, a constant flow of water of one cubic foot per second will water about 50 acres of land. This is considerably less than the corresponding area in Madras or the North-West, but allowance must be made for the larger quantity of water required in a country without rain. From actual observation in Sindh on one of the canals in the Hydrabad Collectorate, one cubic foot has been found to water 68 acres. On other canals a much smaller result was found.

If we then assume that, out of the existing area, one million acres could be brought under the improved system at 50 acres per foot, this would require a total water-supply for the whole Province of 20,000 cubic feet per second, which may be considered as equivalent to three canals, each as large as the Ganges Canal.

It will be remembered that the existing cultivation is exclusively khureef. With the perennial supply of water, a rubbee crop may be reckoned upon. Now the consumption of water for rubbee irrigation is much less than for khureef, and making a reasonable allowance as before for the want of rain in Sindh, one cubic foot of rubbee supply may be reckoned to irrigate 100 acres. Therefore the new rubbee crop will amount to 2,000,000 acres.

The increased revenue will then be 1 Re. per acre on the old acreage, and Rs. 3-4 on the new acreage, that is:—

| | Rs. |
|---|---|
| 1 million acres, at Re. 1, - - - | 10,00,000 |
| 2 ,, ,, 3-4, - - | 65,00,000 |
| Total - | 75,00,000 |

showing a total increase of revenue of 75 lakhs gross, or 750,000*l.* yearly.

At the rates for land and water combined in force in the North-Western Provinces, the total gross increase would be, approximately—

| | Rs. |
|---|---|
| 1 million acres, at Rs. 2-4, - - | 22,50,000 |
| 2 ,, ,, 4-8, - - | 90,00,000 |
| Total - | 1,12,50,000 |

showing a total of 112½ lakhs, or 1,125,000*l.* yearly.

It will next be necessary to estimate the probable charges against this increase. For the canal maintenance and establishments, 12 annas per acre irrigated is not likely to be exceeded, judging by the results of the North Western canals; and even as small a charge as 8 annas an acre is likely to suffice. This charge, at the 12 annas rate, would amount on three million acres to 22½ lakhs yearly. Against this has to be set off the present charge for the same purposes, which may be taken at 3½ lakhs, leaving a net increase of charge of 19 lakhs. To this must be added, however, a sum to cover the additional charges connected with the realization of the increased land revenue. Taking the approximate rate of charge on this account as 10 per cent. on the revenue realised, the addition would be 7½ lakhs, or 11½ lakhs, according to the total rate realised from the land. Under the first hypothesis of a total maximum charge of Rs. 3-4 per acre, the net increase of revenue would be 48½ lakhs, and at the maximum rate of Rs. 4-8 per acre, it would be 86 lakhs. The former amount would be equivalent to 5 per cent. on about 9½ millions sterling; and the latter to 5 per cent. on 17 millions.

The inference that may be drawn from these calculations is, that if such an increase of cultivation as is spoken of can fairly be anticipated to follow the improved system of irrigation, it would, on the lower estimate, not be

unprofitable to the State to spend 9½ millions on the requisite works, and on the higher 17 millions might be spent. Of course it is not for a moment implied that this gives any key to the actual outlay really likely to be necessary, and all that is desired is to show that, on a very moderate estimate of areas and rates of profit, there is *primâ facie* evidence that a large outlay of capital would be covered. It may be added that the Ganges Canal, which is acknowledged to be a very expensive work, is likely to cost when complete, rather more than 3 millions sterling. It was before remarked that, to give such an extent of irrigation, as has been reckoned upon, a supply about three times that of the Ganges Canal would be required. On the standard of the Ganges Canal, therefore, the cost of the works might be taken at 9 millions, so that even at this very high rate of cost, the works would probably be remunerative. If an opinion on such a subject is to be hazarded in the present position of the question, it might, perhaps, not be unreasonable to consider the Ganges Canal standard fully one-third too high for the much more favourable circumstances of Sindh; and at such a rate, six millions sterling would be the whole sum needed, on which, at the lowest rate of income, a return of 485,000*l.* yearly would be realized, being above 8 per cent. At the higher rate, the return would be 860,000*l.*, or 14 per cent.

I would repeat that it is to be understood that the above figures are only intended to show, on such data as can be got, the probably eventual operation of the improved system of irrigation. Time would be required both for the outlay of such large sums, and for the full realization of the entire profits; on the other hand there is every reason to suppose that considerably larger areas of cultivation, and considerably higher rates of charge, could eventually be attained. I conclude therefore that, on the whole, it is fair to anticipate that the interest on any amount of capital really required for such works would be covered by the returns at an early period, and that the prosecution of the proposed further investigations, and the preparation of suitable projects and estimates, is entirely justified.

I have reckoned on a total cultivated area of 3 million acres, and it will be as well to show how far such an extent of land is likely to be available. I estimate that the entire area of the land that could be watered on the right bank of the Indus, between Sukkur and Sehwun, is 3¼ million acres. On the left bank of the Indus, between Rohree and Hyderabad, the total area of British territory is about 2½ million acres. Together, this supplies 6 million acres, and rejecting one-fourth as an allowance to cover barren or unirrigable land, there would remain 4½ million acres irrigable. In the North-West Provinces, it is understood that about one-third of the culturable land is irrigated yearly in the best cultivated districts. But in Sindh, where the whole cultivation requires irrigation, a larger proportion must be taken, and it seems fair to assume that one-half may be irrigated at one time. This would allow of alternate years for fallow for all land, one crop only being taken in each year, which seems amply sufficient. In the area designated we should, on this basis, have 2¼ million acres irrigated yearly, leaving three-fourths of a million to be provided in the lower part of the Delta, and on both sides of the Indus above Sukker, or by a larger amount of land under crop at one time. This additional quantity might very fairly be expected to be obtained from these sources.

As to the power of the existing population to extend the area of cultivation from 1 to 3 million acres, it may be said that the relief obtained by the cessation of the lifting the water, will release a very large amount of labour, which will be immediately available for extending the area under crop at one time. The money value of this labour may be taken at about Rs. 15 per acre on 500,000 acres, or Rs. 75,00,000. The saving of such an amount in labour, whether it is sufficient to meet the full demand for so large an increase of cultivation, as has been reckoned upon or not, must have a very great influence on the progress of the Province; and even if there be some exaggeration in the cost of this labour, it is almost certain that the real relief will be so great as to give an entirely different character to the agriculture of Sindh.

Although my visit to Sindh has been limited to a short period, and my means of forming sound opinions on matters of detail have, therefore, been restricted, it may be useful if I indicate generally the direction in which it has appeared to me that such investigations should be carried out. In doing this, however, it is fitting that I should disclaim any intention of doing more than offering suggestions for the consideration of the officers who may be charged with such a duty, and placing in a somewhat more definite light the character of the operations which I regard as so desirable.

A project was prepared some years ago by Lieut.-Col. Fife, R.E., for a perennial high level canal to be drawn from the Indus at Rohree. For reasons which need not be referred to, no action has yet been taken on this scheme, though it was strongly supported by the present Governor of Bombay, who at that time was Commissioner in Sindh, much on the grounds which have been adduced in the earlier part of this Memorandum. This project, however, provided for a small supply of water only, 1,400 cubic feet per second, and was intended to be worked altogether apart from, and in addition to, the existing system of inundation canals. This indeed was a natural course to suggest at that time. Now, that opinion has so greatly changed as to the proper system of dealing with works of irrigation, and that more comprehensive views can be put forward with reasonable expectations of their receiving attention, such a project must be regarded as insufficient. I have discussed with Lieut.-Colonel Fife the extension which might properly be given to this project so as to bring it into relation with such a general scheme of irrigation as that which I advocate. The conclusion to which I have come is, that this canal should carry about 7,000 cubic feet of water per second, and should supply the whole of the Hyderabad Collectorate as far as the Foolailee Channel. It should be so arranged as to throw water into all the canals now fed from the Indus between Rohree and the mouth of the Foolailee.

The Foolailee is so large a channel, and carries so large a body of water in the inundation season, and is in such good general condition, that it seems desirable to maintain it at all events for the present. The channels which now flow from its left or northerly bank will all be supplied from the new canal, and the water saved will go to increase the quantity available on the south. If needful, an additional head might be opened opposite to Kotree near Hyderabad, for the supply of the lower portion of the Delta, and a similar work could be constructed opposite Jarruck. It is probable that the canal from Rohree will give a sufficient supply of water for the rubbee cultivation throughout the Hyderabad Collectorate. It is questionable how far rubbee can be profitably raised in the lower part of the Delta, and it must be left for further investigation to show the precise form which should be given to the works for this portion of the Province. Both at Jurrack and Kotree, facilities exist for the formation of dams such as the Madras Anicuts, and, on the whole, there is nothing to prevent a very ample water-supply being given to the eastern half of the Delta.

On the left bank of the Indus, above Rohree, there is less apparent facility for improving the irrigation. There is no permanent bank, and the country is liable to heavy inundation. But there is no reason to question the practicability of maintaining a permanent canal head at some suitable point, or of protecting the country which is now flooded.

On the right bank of the Indus, above Sukkur, the conditions are more favourable than on the left bank, but there may be difficulty or expense in maintaining a permanent head. At Sukkur there is a very favourable locality for a canal head to supply the region between Sukkur and Sehwun, at which place the alluvial plain of Sindh is cut off by the hills which there abut directly on the Indus. It seems probable that a single large canal, of about the same size as that proposed for the left bank, viz., to discharge 7,000 cubic feet per second, would supply the whole area of the Shikarpoor and Kurrachee Districts butween Sukkur and Sehwun. The water-supply in this part of the Province is at present much more ample than in Hyderabad; but from the absence of a proper engineering control over the supply, considerable danger is incurred of serious floods, and as a fact, injury from this cause is too frequent. From the strong slope of the surface towards the west, the extremities of the distributing channels in many places require to be embanked, and this having been carried out without a proper system of levels, and without due attention to the precautions required under such circumstances, much waste of water and injurious flooding of land takes place.

On the east, or left bank of the Indus, the land is generally so high as to require the natural fall of the surface to be economised to secure a satisfactory slope for the distributing channels. Here the first object of the Engineers will doubtless be to bring in the main supply at an improved level as early as possible. This being done, the existing channels will be capable of doing greatly increased irrigating duty, and their

thorough re-arrangement may be carried out by degrees afterwards.

On the right, or west bank, I am inclined to think that attention is at once required to the main distributing channels; and that by placing these in a position of proper efficiency as regards their levels, having due regard to their eventual character as channels to carry a high level supply, great immediate improvement could be secured. The fall from the Indus to the south-west is so great, moreover, that real danger of a serious nature is incurred by leaving the main channels open from the river without engineering control. The success which is claimed for some of the canals made by the District Revenue Officers, and particularly that called the Fordwah, is undoubted; but it would be a great misfortune if, from the want of efficient power of control over the water entering such cuts, a calamitous flood were to happen, and there is every appearance of such an event being at least possible. The head sluice of the Forwah is in a very critical condition, and, if it were carried away, it would not be easy to save Larkhana from a damaging flood, if the result was not something of a much graver sort, such as a large portion of the Indus breaking out over the country in that direction.

The country between Sehwun and Jurruck is hardly susceptible of perennial irrigation from the Indus, and calls for no further comment.

The western Delta, so far as it may be found to require improved irrigation, can readily be supplied from Kotree or Jurruck. It is from this quarter also that it is probable that Kurrachee must look for a fresh water-supply, of the abundance which seems requisite for a town and port of the importance which it is likely to assume. I see no engineering difficulty in the way of sending down a copious supply of fresh water into the Garra Creek from Jurruck or Kotree, and thence carrying it, by help of a weir, across the Mulleer River to Kurrachee. By avoiding all expenditure that was not essential for such an object, it could, I think, be attained for an outlay not incommensurate with its importance, but of course exact surveys and estimates alone can test speculations of this nature.

It only remains for me to refer briefly to the extreme eastern districts of Sindh, Thurr, and Parker. These now receive a limited supply of water during the inundation by an old channel called the Narra, fed by a new head constructed by our Engineers, drawn from the Indus at Rohree. A new canal has also been excavated from the end of this old channel, and is known as the Mitrow Canal. From various causes, this canal has not been so successful as could have been desired, or was anticipated. The efficient source of these causes of want of sucess will, I think, be sufficiently found in the absence of a proper professional administration for irrigation operations in Sindh; and the removal of this defect will, I have no doubt, be very soon followed by the application of all needful remedies to the shortcomings of the Mitrow Canal. There are some other minor channels leading from the Narra, lately dug, which have already done much good in extending cultivation; and there should be no great difficulty or expense in considerably adding to the supply of water thrown into these districts, either by the Narra Channel, or from the surplus of the new main Hyderabad Canal, or from the Foolailee, or some new channel taken from the Indus near Hyderabad.

I shall now proceed to make some observations as to the fiscal system which seems likely to be best suited to the condition of things which would exist were the proposed irrigation works carried out. The question at once arises, whether the whole of the State demand should be levied in one sum as at present, or whether a separate water-rate should be levied; and, if so, under what sort of system and with what objects? At first sight there is an appearance of simplicity in the present system which recommends it as preferable to the confessedly artificial plan of levying a separate water-rate where, as a fact, cultivation is not possible without irrigation. But further reflection seems to me to show that, in truth, the land revenue is fixed on a perfectly artificial system, and that when a settlement of the revenue has been made, the charge on this account no longer, so to speak, represents agricultural facts, but is a deduction from them. So long as the land revenue is directly based on the actual produce of any field under cultivation, such cultivation being impossible without water, to separate the charge for the water must of course be quite an arbitrary proceeding. But as soon as the land revenue becomes an average or estimated sum, which will satisfy the Government as a composition for a term of years, it is just as easy and simple to separate this into two parts as to take it in one sum, if there be any sufficient cause for doing it. The question therefore is, whether there is such a cause; and I think it will readily be shown that the system of making the separate charge for water, which has been adopted in other parts of India, should eventually be followed in Sindh also.

If the supply of water were unlimited, there would be no reason for controlling or checking its use. But this not being the case, and the value of the water being so great, it becomes very important that no waste should be allowed; that the available supply should be distributed equitably, having regard to the area of land under cultivation and prescriptive rights of priority of enjoyment; and that the State which supplies the water at the general expense of the country should receive in payment for it a fair sum to cover the actual cost of maintenance and the interest on capital, and to provide a reasonable profit in aid of the general resources of the State. Now, the introduction of systematic irrigation is essentially a tentative process. It is only by experience that it can be ascertained how much water is required for the several qualities of land and crop, and what is its value; and the first duty of the irrigation Engineer is to endeavour to ascertain these points. For the former purpose he measures the irrigated area, and finds out what extent can be watered by a given volume of water. In like manner, in fixing and apportioning the charge for the use of water, it is almost essential to begin by a calculation based on the area of land irrigated. In a more advanced stage it becomes possible to make compositions at fixed sums, or to regulate the charge according to the volume of water actually supplied; but practically neither of these courses can be adopted with advantage until sufficient experience has been gained, under a system of crop measurement, of the actual wants of the lands to be watered, and of the value of the water as supplied for irrigation.

On the introduction of improved irrigation in Sindh, it will thus be necessary to ascertain the actual areas irrigated: *first*, to get data for calculating the proper irrigating duty of the water; and *second*, to apportion the increased charge fairly. Even if the increased charge were levied simply as an increased lump-sum of land revenue, it must in detail be arrived at by a consideration of the actual area cultivated with the improved water-supply. And this will hold good whether the Revenue Settlement has been made or not.

Moreover, where the settlement has been made on the basis of the old condition of irrigation, and an improvement in this takes place, it will not be possible with equity to make a *pro rata* addition to the whole revenue, because it will not follow that all the land will be benefited, for every year of the residue of the term, or for any one year. It is only after experience shall have shown what is a fair average estimate for one year, with another of the benefits of the new system, that the water-rate could be brought under settlement with the land revenue.

It seems, therefore, almost an obligatory measure that, in all settled villages, during the period of transition at least, a separate water-rate shall be taken, on the reckoned actual irrigated area. Now, before the new canals are completed, the whole of Sindh will almost certainly have come under revenue settlement, and therefore the separate water-rate will practically everywhere become necessary.

It further appears desirable that, following the practice of the North-West Provinces, the increased charge for the improved water-supply shall be borne by the cultivator as distinguished from the zemindar. The existing land revenue being in fact that proportion of the rental received by the zemindar from the cultivator, which custom assigns to the State, it appears proper to leave this unchanged until the cultivator's rental is raised. It is probable that in Sindh, as in the North-West, the improvement of the irrigation will not at all of necessity lead to the direct increase of the cultivator's rental. Where, for instance, the customary rental is a certain share of the produce, the profits of the cultivator might be greatly increased by reduction of the cost of irrigation without any important change taking place in the produce which alone regulates the zemindar's interest in the process. Here the cultivator would receive the whole benefit, and should bear the whole charge. Where rents and zemindar's profits practically become increased as a secondary result of these improvements, it will be just that the Government should participate in the increased profits according to the customary rule of the country, and under the terms of any revenue settlement from time to time existing.

In connexion with the matters last discussed, it may

be convenient to say a few words on the subject of the Sindh *Huccaba*, or rate to cover the cost of canal clearance. As a fact, no such rate is levied, excepting from Jagheerdars, and the *huccaba* for revenue-paying lands is only distinguished from the land revenue proper by being arbitrarily separated in the Collector's accounts. Before the British occupation of Sindh, the usual custom was, that the Zemindars cleared the canals by their own cultivators, the Government making a small allowance of grain to the work-people, and paying for the supervision, but at the same time taking a corresponding small portion of the produce, under the same of *huccaba*, in addition to the regular land revenue. When Sindh became British, the revenue in kind was commuted into a money payment, and the practice of clearing the canals by unpaid labour was also discontinued, the Government in lieu fixing the money land revenue rate at such an amount as covered the estimated cost of clearance by paid work-people. Of course this was done in a rough and approximate way. Subsequently, when it was pointed out that, under this system, the Jagheerdars got their canals cleared at the expense of Government, it was ruled that they should be required to pay 3 annas per beegah (about half an acre) to make good this charge for all land irrigated by them from canals cleared by Government; and at the same rate, a separation was made in the Collector's accounts of the nominal *huccaba* from the land revenue.

Under a later arrangement, this nominal *huccaba* rate has been ordered to be transferred from the Imperial to the Local Fund income, the charge for the canal clearances at the same time being made a local charge. Obviously, the sole financial effect of this measure is to make a permanent contract with the Sindh Local Funds for canal clearances at the rate of 3 annas per Sindh beegah irrigated. It will suffice if I here briefly state my opinion that such a system is even now needless and objectionable, and that it would be quite inapplicable to the condition of things that would exist, were a proper irrigation administration established in the Province. That the apparent necessity for such a measure should have been conceived to exist, seems to me the result of misconceptions and defects of administrative system, which I may take another opportunity to explain.

It remains for me to refer to one other consideration which should receive serious attention when adopting a policy of providing Sindh with permanent irrigation at a high level. I refer to the grave responsibility which will rest on the State to maintain the works in proper efficiency. Any want of attention to the water-supply of a country so completely without rain, and so thoroughly dependent as it would become on a highly artificial system of irrigation, will be calamitous. A country thus placed is in a position as critical as one in which the entire surface is preserved from the irruption of the sea by dykes.

The conclusion to be adopted in the face of this responsibility should certainly not be that on this account such works should not be undertaken, but that every possible precaution should be adopted to guard against accidents. And having regard to the character of the risk, and to the present comparatively small amount of the population of Sindh, it seems unsafe to trust to the ordinary supply of labour that could be obtained in the open market, to meet all possible emergencies that might arise after such a canal system as I have contemplated had come into operation. Whether for effecting clearances of the channels, or repairing breaches in the embankments, or carrying out any other really essential work, the administration should have the power, under suitable check, of commanding the labour of the entire community to effect what was necessary in behalf of the general interests. If a conscription or an enrolment of the whole number of able-bodied citizens is legitimate for the defence of a country against an armed enemy of the State, how much more legitimate is the exercise of a similar power for the protection of the whole community from the most frightful calamity that can befall it—a general drought and famine? If the tremendous character of such visitations had been estimated at their proper value, some of the blackest pages in the history of the British administration in India would have had no place there; and it would be inexcusable indeed, if, in the face of the lesson which has been lately read to us in Cuttack, any proper precaution was omitted when attempting to deal with the irrigation of a whole Province. A law having such an intention as is here contemplated, exists, I think, in Madras; and something of this nature should be introduced in Sindh simultaneously with the resolution to prosecute the new system of works.

R. S.

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# NOTE ON INUNDATION CANALS.

In discussing the question whether inundation canals can be introduced with advantage into the North-Western Provinces, there are two points to be considered,—*first*, what the difference is in the conditions here and in the Punjáb as to the possibility of constructing such canals, and as to their utility to the country; *second*, whether, under these altered conditions, they would pay a moderate interest on expenditure.

2. It may be useful if I record the impressions I have formed on these points during my recent inspection of the Multan canals, from the conversations held with the local officers; but I need hardly say that I write with full consciousness of my inability to form an absolute conclusion on many of the considerations involved, which can only receive due appreciation from a professional engineer.

5. First, as to the conditions of construction and utility. There are many peculiarities which make the south-western portion of the Punjáb suitable for inundation canals, but which are non-existent in the North-Western Provinces. The heads of these canals are not protected by any masonry or other works; they are merely ditches dug in the river-bank, and are generally taken off from a bay or back-water where there is no rapid stream and no erosion going on; but, as the course of the stream is constantly changing, the head of the canal is frequently washed away by the river making a turn and eating away some miles of the bank, or else the river recedes and the canal has to be dug in pursuit of it. Such changes require the command of abundance of labour, and would be very expensive, unless there was much waste land which could be taken up for a new head or an extension at very slight cost.



4. Again, the canals are entirely unprovided with escapes or regulators. In ordinary seasons all the water they can carry is readily taken up. If a river flood lasts a long time and all the fields usually irrigated by the canal have received as much water as is good for them, the cultivators shut off their *khussis* or cuts, and the water either passes out at the tail or bursts the banks, and in either case floods a great deal of land and often does considerable harm. But the people are accustomed to this and do not grumble much at it; and the land being naturally very dry the water soon gets absorbed, and much of what is flooded is waste land, so that no great loss is incurred. In the North-Western Provinces, where very little land is waste, and the standing crops would suffer more severely through the soil being naturally wetter, the loss would be greater and would be more felt.

5. No doubt the inundation canals could be laid out on the same plan as our perennial canals, with anicuts, regulators, and escapes, but then the cost would be very much heavier, and the financial position of the scheme would be altered.

6. Further, the inundation canals depend for their success on two characteristics of the country: the early and moderate rise of the river, and the lowness of the irrigated land. The average rise of the Satlej over eight years has been two feet above its lowest level by the end of March, three feet by the end of April, four feet at the end of May, six and a half feet in June ten feet in July, eight in August, five and a half in September, one and a half in October. I doubt if the rise of the Ganges or Jumna is so large in April or May, so little in July and August. A canal which is deep

enough to catch the benefit of the melted snow would be buried fathoms deep by the floods in the height of the rains.

7. The tracts in which inundation canals run are mostly what we should call khádir, being very little above the bed of the river. Thus a section across the Doab near Multan from the Chenab to the Satlej gives a nearly level tract for some ten miles, two feet above the cold weather river level; then comes a rise of 3, 5, 4, 3 feet, then a fall again (in the old bed of the Beas) to the level of the Chenab, then a gradual rise to the Satlej, which runs about ten feet above the old bed of the Beas, in the centre of the Doáb. Thus a canal 10 feet deep would bring water to the level anywhere, and would begin irrigating almost directly it left the river. There is no heavy cutting and no long mileage of unprofitable canal bed till the water is brought out on to the surface. In our case the khádir of the Jumna or Ganges does not require irrigation at all; while the bángar is raised so much above these that we should require a deep cutting lasting for many miles before the water was brought on to the level of the country. All this would add considerably to the expense of the scheme.

8. Lastly, all the clearances and repairs are done by a system of contributed labour (known as cher labour) which is accepted by the people of the Punjáb as the custom of the country, but which could not easily be introduced into a country where it is not customary. If all this work had to be done with paid labour, a much higher water-rate would have to be charged to cover this expenditure.

9. I turn next to the utility of the irrigation thus afforded. The peculiarity of this part of the Panjáb is the normal want of rain, which seldom exceeds five or six inches in the year and often falls to two or three inches. Under these circumstances, no kharif crops at all can be raised by the natural rainfall: the canal water is indispensable to them. The people are dependent on the canals for their fodder crops, without which their cattle would die. Now this is not the case in North-Western Provinces. In ordinary years the normal rainfall is sufficient, unassisted, to produce grass and fodder, and to bring the kharif crops to maturity. Only in years when there is a failure of the rain—say once in 10 years at the outside—would canal water be of great use to the kharif food and fodder crops; in the other nine years it would generally do harm rather than good if admitted into the fields.

10. A large proportion of the kharif area is under indigo, for which water is taken early in the year, *i.e.*, in April. But in the North-Western Provinces an inundation canal could get no water at this time, since the rise from melting snow is not great, and all that there is is required and utilised by the perennial canals. No surplus water runs away past the main anicuts till the rains have well set in.

11. Besides the kherif crops, canal water in this part of the Punjáb is almost essential for the rabi; the land is moistened by means of the canals, and is ploughed through July and August. But after this the wells carry on the work, The canals are seldom available so late in the year as to give the field the last watering (or paleo) before sowing. They ordinarily cease to flow by September 15th; in only about two years out of ten do they flow later. In the North-Western Provinces, then, in years when the rainfall is normal, the water would not be required at all for the purpose of preparing the land, and when it stops too soon—say on or before September 15th—the canals would be of use for giving a paleo watering in only about two years out of ten.

12. Thus, whereas in the Panjáb canal water is indispensable in every year for maturing kharif crops and preparing the ground for rabi, it would be useful in the North-Western Provinces only about once in ten years for maturing kharif crops, and about twice in ten years for preparing the fields for the rabi. Whatever the value of the water to the cultivator is in the Panjáb, it would be less to the cultivator in the North-Western Provinces. We should therefore have canals which cost much more to construct, and which bring in a much less water-rate, besides the occasional damage they would cause.

13. But it may be argued that, although the cost would be greater and the rate per acre less, still the water rate would bring in a sufficient percentage to justify the outlay. On this subject I cannot say anything precise, but I can present some data for consideration; and Mr. Rose, the Settlement Officer of Multan, has favoured me with a memo., which is printed as an appendix to this note, showing the figures for a typical canal.

14. Mr. Garbett, Superintending Engineer of Canals in Multan, calculates that a canal of this sort can be excavated at a cost of Rs. 7-8-0 per irrigated acre. Mr. Rowe shows that his specimen canal, which is 20 miles long, would have cost Rs. 47,500 if excavated by paid labour (as a new canal would have to be) and irrigated at the last settlement, *i.e.*, ten years ago, 4,750 acres; the cost, therefore, was Rs. 10 per acre. The wet revenue due to the canal was Rs. 2,790, or Rs. 0-9-8 per acre, or 5·9 per cent. on the estimated cost of excavation alone. The canal has now been improved and made more efficient; it irrigates a larger area and will bring in a larger revenue, but the figures are not yet ready to be presented. However, the return is hardly likely to be more than doubled, or say 10 per cent. on the outlay. Now, what could be expected in the North-Western Provinces? The original outlay must be very much larger. If the canal is constructed on the pattern of a perennial canal it must cost as much, or Rs. 34 per irrigated acre; and in order to obtain a net 5 per cent. on that the rate per acre cannot be less than Rs. 2. But if the Panjáb cultivator pays only from 8 annas to 1 Re. for his water, where it is vastly more useful to him, it seems impossible to hope that the North-Western Provinces cultivator would be willing to pay more than 8 annas per acre for water which would so seldom be of any use to him. In the case of the Fatehpur-Sikri inundation works, which provided a "paleo" watering for rabi fields with tolerable certainty, I believe only 2 or 3 annas per acre were charged. I cannot, therefore, think that it would be found possible to collect a larger rate than 8 annas per acre in the North-Western Provinces, and I do not see how that could possibly remunerate the State for the necessary outlay which would have to be incurred.

C. A. E.

12th December 1878.

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## APPENDIX.

### *The Dauránah Langánah Canal.*

As I cannot yet give the new canal jummas, it will be better first to give the complete statistics for the canal as it stood at the regular settlement, and to add a note showing the changes which have taken place since.

### I. Original Cost.

*a. Taking up the Land.*—The canal was made under native rule, and, as a matter of fact, nothing was paid for taking up the land. But, under present rules, the cost of this may be estimated as follows:—The canal was 20 miles long, 20 feet broad, and 20 feet on each side may be allowed for spoil banks. The total breadth would thus be 60 feet or 20 yards. The area covered by the canal would therefore be 1,760 yards × 20 × 20 = 704,000 square yards or 145 acres. Assuming the whole of this to be private property, the cost of taking it up, at the price generally paid in this district, would be about Rs. 20 an acre, or Rs. 2,900.

*b. Digging the Canal.*—The canal is, on an average, 6 feet deep. It is 20 miles long and 20 feet broad. Its cubic contents would be 12,672,000 feet. The general cost of digging such a work is 6 annas per 100 feet, or Rs. 3-12-0 per 1,000; this is what was paid by the canal officer for an extension of the Matithal, the next canal to this. At this rate the cost of digging would be Rs. 47,520.

*c. Cost of Jhálars.**—At settlement there were 251 jhálars attached to wells, and 7 working alone; in all 268. It is very usual to use the woodwork of the wells for the jhálars also; but assuming that each jhálar is complete in itself its cost may be put at Rs. 40. This would give for the 268 jhálars Rs. 10,720.

*d. Khassís (or distributary cuts called "Guls" in North-Western Provinces).*—The length of the khassís by the old records is about 107 miles, or in round numbers 565,000 feet. The average breadth is 4 feet and the average depth 3 feet. The total cubic feet to be dug

* *i.e.*, pucka wells sunk at the side of the canal, from which the canal water is raised by Persian wheels. These are required all along the canal and the cuts, wherever flow irrigation is impossible.

would therefore be 6,780,000. The cost, at the rate for digging the canal, viz., 6 annas per 100 cubic feet, would be Rs. 25,425.

The total original cost would thus be :—

| | Rs. |
|---|---|
| *a.* Taking up land - - - | 2,900 |
| *b.* Digging the canal - - | 47,520 |
| *c.* Cost of jhálars - - - | 10,720 |
| *d.* Digging khassís - - | 25,425 |
| Total - - | 86,565 |

II.—Cost of Maintenance.

*a. Clearance of the Canal.*—This is done by chers—for the nine years previous to the settlement the average annual clearances represented 6,970 days' labour, or 77 "chers" at 90 days each. In the various estimates on the cher system we have assumed 6 annas a day as the fair value of a cher's labour. At this rate the cost of the annual clearances would be Rs. 6,970 × $\frac{6}{16}$ = Rs. 2,616.

*b. Clearance of Khassís.*—It is almost impossible to estimate this except by the roughest proportion sum. Thus, the cubic contents of the canal are 12,672,000 feet; the annual clearances cost Rs. 2,616; the cubic contents of the khassís are 6,78,000 feet; the cost of their clearances would be Rs. 1,470. But the clearance of the khassís is done by the people themselves at odd times, and the work is much easier than the clearance of the canal. The cost should, therefore, be considerably under Rs. 1,470.

III.—Return.

*a. To Government.*—The irrigated area at settlement was 4,747 acres. The remissible (*i.e.*, canal) jumma was Rs. 2,790, which gives a rate of a little over 9 annas an acre. If the canal really cost the Government Rs. 86,565, the annual income would only give a little over 3 per cent. interest on the original outlay. But the actual cost to Government was nothing; and even in the estimate of Rs. 86,565, only the cost of taking up the land and digging the canal would fall on Government, for, in any case the khassís would be dug, and the jhálars erected, by the persons taking the water. The cost to Government would therefore be only a little over Rs. 50,000, and on this the income of Rs. 2,790 would pay more than 5 per cent. interest, and from the statements which accompany Mr. Morris' report on the canals (Appendix C.) it appears that he estimated the total canal jumma at Rs. 5,000. This would give 10 per cent. on the original outlay.

*b. To the Cultivator.*—It is impossible to estimate this without working out most elaborate returns, which, after all, would be very untrustworthy. The clearance of both the canal and the khassís falls on the cultivator, who pays to the proprietor in kind. But the cost of original construction of the khassí and the erection of the jhálar is borne by the proprietor. The cost to the actual cultivator is therefore only the labour he has to give for clearances; and by the above estimates this would be :—

| | | |
|---|---|---|
| For the Canal | - | 2,616 = 0-8-9 per acre. |
| | | 4,747 |
| ,, Khassís | - | 1,470 = 0-5-0 ,, |
| | | 4,747 |
| Total | - | - = 9-13-9 per acre. |

IV.—Changes since Settlement.

The canal has been considerably lengthened, and is now about 32 miles long. Its irrigated area has risen to 10,515 acres. What will be its new canal jumma cannot be stated until the new assessments have been sanctioned by Government, and distributed over the different wells. But it will no doubt be found that the assessment has risen in proportion to the increase in cultivation.

Charles A. Roe,
Settlement Officer.

3rd December, 1878.

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*Note on the Administration of Contributed Labour (known as Cher Labour) in the Inundation Canals of the Multan and Muzaffargarh districts, Panjab.*

*Multan.*—The Canal Engineer (or the Deputy Commissioner in cases where the canals are managed by him) is able to state, by the experience acquired over a period of years, the average number of chers, or labourers, working each for 90 days, required to make the annual clearances of silt in the main channel of the canal. This will be entered in the settlement records now as a fixed arrangement, subject to revision after five years.

2. This figure is taken as the devisor, the number of acres irrigated by the canal during the preceding year as the dividend, and the quotient is the number of irrigated acres which are bound to provide one cher. The average number is about 25 acres. If a proprietor owns 25 acres of irrigated land, he has to supply one labourer for 90 days; if he owns 10 acres, he has to supply two-fifths of such a labourer, *i.e.*, a labourer working for 36 days.

3. The number of acres to a cher being thus fixed, the information is sent to a panchayet of lumberdars of the villages irrigated by the canal. This panchayet consists of three to nine members (knows as munsifs) according to the length of the canal. They have to apportion to each village its number, while the lumberdars of each village have to arrange for that number, and to draw up a list showing the names of each cultivator of irrigated land and the number of chers or fractions of a cher that he has to supply. That list is sent in to the canal officer. In practice, however, the number of chers allotted to each village does not depend so much on the irrigated acres as on past precedents, and on the knowledge the panchayet holds as to the capacity of the village to supply labour. It ought, perhaps to depend strictly on the irrigated area; but small variations from year to year are disregarded, and allowance is made for lift as opposed to flow irrigation, and for very long cuts as opposed to very short cuts. Any appeal against the lumberdar lies to the panchayet; against the panchayet's apportionment to the canal officers. But, practically, all complaints go to the canal officer, and he attends to any in which considerable injustice is done.

4. The chers have to meet on the 15th December at the place fixed by the canal officer (ordinarily the mouth of the canal), and to work downwards. He fixes the depth to be dug, sometimes by digging pits and placing pegs; but in practice they generally know now much to do, and they distinguish the silt deposit from the original bed of the canal. They are expected to work from sunrise to sunset, but in practice do not begin much before 9 A.M.; still they do 120 to 150 cubic feet, and nearly double what a paid labourer would do. They bring their own tools, blankets, food, &c., and sleep under trees, or wherever they can, if too far from home to return there. As a general rule, the cultivators work themselves: rich men procure substitutes, but it ordinarily costs them Rs. 15 a month.

5. The canal officer keeps a writer to take the names of each cher down, day by day, and, by checking this, he prepares a list of absentees and sends it in to the Deputy Commissioner, who collects the fines. The fine fund is applied to purposes of general improvement, but not properly to extensions or other improvements in which the old irrigators are not concerned. If the chers are kept at work over 90 days, they are paid at 6 annas a day out of the fine fund. The local officers do not advocate extension of this system to the excavation of new canals, only to the clearances. New canals should be paid for in cash.

6. In Muzaffargarh there is no canal officer, but a canal superintendent under the Deputy Commissioner, and a committee of irrigators (comprising both proprietors and tenants) to each canal. This committee goes over the canal and decides roughly how many chers or day labourers are required for clearance, and how many each village should contribute. The lumberdars allot this number within the village to the cultivators. There are two systems for clearance—one, like that of Multan, the chers all collecting and working together; by the other, each village clears out the silt in its own area. This is unfair to the villages at the head and tail, where most silt is deposited.

7. Mr. O'Brien gives a bad account of the working of the system in this district, as unfair, wasteful, and inefficient, but considers that, if well managed, the system is a good one, and he advocates the work being made over to an officer of the Canal Department.

29'11/78. C. A. E.

## Inspector General's Tour.

*Note on operations of the Godavari, Kistna and Cauvery Irrigation Works, during* 1876-77.

The following facts and figures illustrating principally the operations of the Godavari and Kistna Irrigation Works during the late famine, were gathered during my late tour in the Madras Presidency, and may prove useful in obtaining favorable consideration for any proposals which may hereafter be submitted for the completion or improvement of the irrigation systems mentioned in this note.

2. The capital outlay upon the Godavari Irrigation Works up to the end of 1876-77 amounted to Rs. 74,17,074: the unexpended balances of sanctioned estimates (including provision for establishment at 25 per cent., and tools and plant at 8 per cent. on the provision for works, amounted to Rs. 11,58,352; and estimates for the completion of works in the central delta amounting, with provision for establishment and tools and plant. to about Rs. 22,50,000, have yet to be submitted. The total cost of the completed system of canals will therefore be in round numbers about Rs. 1,08,50,000.

The annual cost of maintenance and repairs amounted in 1876-77 to Rs. 1,41,829. To this sum must be added Rs. 66,900 as share of establishment, general, and special, chargeable, to repairs, and Rs. 1,12,250* estimated cost of collection of revenue, making a total annual expenditure on maintenance and collection equal to Rs. 3,20,979.

3. The capital outlay on the Kistna Irrigation Works up to the end of 1876-77 amounted to Rs. 47,29,071, and the total cost of completed works will, it is estimated, be about 138¼ lakhs of rupees.

The cost of maintenance amounted in 1876-77 to Rs. 1,16,604, to which must be added Rs. 52,100, as share of general and special establishment, and Rs. 49,487† as estimated cost of collection, making a total annual expenditure on maintenance and collection equal to Rs. 2,18,191.

4. The irrigation works in Tanjore and Trichinopoly have cost up to end of 1876-77 Rs. 13,53,430, and it would be very desirable to spend another 15 lakhs of rupees on their improvement. The total annual cost of maintenance, including general and special establishment chargeable to that head, amounted in 1876,-77 to Rs. 1,19,179. The cost of collecting the revenue is not known, but if estimated at 3½ annas for each acre irrigated, as has been done for the Kistna and Godavari systems, it would amount to Rs. 2,11,029, and the total cost of maintenance and collection to Rs. 3,30,208.

5. In the Godavari delta 425 miles of canal are now navigable and 495 miles will be navigable on the completion of the works: in the Kistna delta 286 miles of canal are now navigable, and 320 will be so on completion of the works. The Tanjore and Trichinopoly works do not provide for navigation. The canals of the Godavari and the Kistna are united by the Ellore Canal, and as a large proportion of the Kistna produce passes down the Godavari Canals to the port of Coconada, it will be better to consider their results together.

During 1876,77 108 passenger and 2,093 cargo boats, having a registered tonnage of 45,874 tons, plied on the canals of the two deltas. The ton-mileage amounted to 19,669,153, which is equivalent to a goods train carrying about 76 tons net, run along the whole length of open canal on each day of the year. The estimated value of the cargoes was Rs. 5,51,31,114, and the State charge upon the whole movement of goods during the year was only Rs. 68,677 or ⅔ pie per ton per mile. The State tolls on the Erie Canal amount to 1·38 dollars on the American ton of 2,000 lbs. for 340 miles of canal, which is nearly equivalent to 1¼ pie per ton per hour. In France the State tolls amount to about ⅓ pie for first-class, and ⅕ pie second-class goods per ton per mile. From the information obtained by me regarding the actual cost of carriage by canal, exclusive of tolls, I am quite sure that it cannot exceed 4 pie per ton per mile. The total cost of carriage would then be 4⅔ pie, or say even 6 pie per ton per mile, the cost by cart on the bad roads of the deltas would certainly not be less than 3 annas, and by pack-bullock 4½ annas per ton per mile, so that the saving effected by the delta canals during 1876-77 on carriage of goods alone must have amounted to at least 30 lakhs of rupees.

6. The total amount of revenue due to the Godavari Irrigation Works is shown by the collector in Appendix I of this note, to be Rs. 14,97,460 for 1876-77. But this sum includes credits for *assessment* and water-rates of wet waste brought in (see explanatory note on column 3), Rs. 2,55,917, and from this amount the credit on account of land assessment has to be eliminated as not being properly a canal asset. I was informed in Madras by Mr. Puckle, the Superintendent of Revenue settlements, that a deduction of one fourth of the total would be a very fair allowance to make for the land revenue. Making this deduction, we obtain Rs. 14,33,841 as gross credit for the year to the canal works. From this sum must be further deducted the charges for maintenance and collection as determined in paragraph 2 of this note, and the remainder (Rs. 11,12,502), being net amount left to meet interest charges, gives a clear return of 14·9 per cent. on the outlay incurred up to the end of the year.* The collector's statement gives however only approximate figures and closer and more accurate enquiry will probably somewhat reduce the percentage. In like manner it can be shown from Appendix II. that Rs. 7,05,593 represent the gross credit fairly due to the Kistna Irrigation Works† and deducting from this sum the maintenance charges as determined in paragraph 3, we obtain a net balance of Rs. 4,57,402, or 10⅓ per cent. clear interest on the capital outlay to the end of the year.‡ The percentage must undoubtedly have been somewhat higher than this, as 1876-77 was a year of drought, and the irrigation area must have been in excess of that of 1875-76.

7. The area irrigated from the canals in the two deltas amounted to 789,369 acres. The returns of irrigated areas do not distinguish between rice and dry crops watered, but by far the largest proportion of the irrigated area is under rice, and a deduction of one-fourth for gardens and dry crops will be largely in excess of the reality.§ The produce of an acre of rice land in the Kistna and Godavari is from 800 to 1,200 seers (1 to 1½ Putti) of rice. Taking the lower of these two figures, and assuming that only 550,000 acres of rice were watered during the year, we obtain 1,100,000 maunds of paddy as the produce of the irrigated land. The wholesale price of rice was about Rs. 90 a "Putti" at the time of my visit to Dowlaishweram (it had been as high as Rs. 120 during the famine), so that the gross value of the rice, raised by means of the Godavari and Kistna canal, during a year of famine when, to judge from the condition of neighbouring districts, there would not otherwise have been an acre ripened, may be taken at 495 lakhs of rupees, or *four times the whole capital outlay to the end of the year on the canal works of the two deltas.* The calculation has been studiously based on low and moderate figures, in order to avoid any imputation of exaggeration, the deduction for dry crops watered being considerably in excess of the reality, and no account whatever having been taken of the value of these crops.

The population of the irrigated tract of the Godavari district, which has a gross area of 2,023 square miles, is estimated at 900,000 souls. I have not the figures showing population of the irrigated tracts of the Kistna district, but as its gross area (2,110 square miles) is almost exactly equal to that of the Godavari, and the physical and agricultural conditions of the two deltas are very similar, their united population may be fairly assumed at about 1,800,000. It is therefore evident that by far the larger proportion of the gross out-turn of rice would be required for local consumption, but that an enormous amount of wealth must have found its way into the two deltas during the late famine is very plain from the following figures. The value of the paddy and rice exported by sea from the Godavari and Kistna Districts from July 1876 to November 1877, amounted to Rs. 90,16,197. The value of the paddy and rice imported during the same months was Rs. 4,40,577, therefore the net excess in value of paddy and rice exported by sea during the famine over that imported, was just 86 lakhs of rupees, and the returns quoted above take no account of the rice sent out of the

* 3½ annas an acre on 513,143 acres of irrigation.
† 3¼ annas an acre on 226,226 acres of irrigation.

* Rs. 74,17,374.
† The figures given are for 1875-76, but the revenue does not vary much from year to year; the demand for rice, the staple crop, being fairly constant.
‡ Rs. 47,29,071.
§ These figures have been taken from the Madras Irrigation Progress Report for 1876-77. According to the figures given by the Collector of the Godavari district in Appendix I. and the Abstract of Crop Register of Kistna Canals in Appendix VII. Series, irrigated in the two deltas during 1876-77 amounted to 821,565 acres.
§ See Appendix No. III

districts by carts and pack bullocks to the neighbouring unirrigated upland tracts and the Nizam's territory.

9. The total value of all merchandize, bullion and specie exported by sea from the two districts during the above-mentioned months was Rs. 2,49,32,025; the total value of the imports was Rs. 57,88,991, leaving a net balance in favour of the exports of 161¼ lakhs of rupees.

The Godavari Irrigation Works were commenced in 1844–45; those of the Kistna delta in 1852.

The average annual value of the exports by sea from the Godavari District between 1845 46 and 1850 51 was Rs. 10,76,424: of the imports Rs. 4,42,345. During the same years the annual collections of revenue in the district averaged Rs. 22,57,581.

The total value of the exports from December 1st, 1876 to December 1st, 1877, was Rs. 1,48,62,274, of the imports for the same period Rs. 27,67,754, while the revenue amounted in 1876 77 to Rs. 57,41,668; that is, the exports have increased 14 fold, the imports 6 fold, and the revenue 2½ fold in value since the irrigation and navigation works came into operation, and that the increase is very considerably due to the beneficial action of these works those on the spot will be the very first to admit.

The Godavari, however, gets credit in the matter of exports and imports for a certain amount of increase due to the Kistna works.

The value of the exports by sea from the Kistna District during the five years 1850–51 to 1854–55 averaged Rs. 3,36,284; of the imports Rs. 4,29,646. Owing to changes in the boundaries and transfers of taluks from one district to another, the revenue of the whole of the present Kistna District cannot be ascertained for the five years above quoted, but the annual average of the *irrigated* "taluks" for this period was Rs. 1,69,069. The total value of the exports by sea from December 1st, 1876 to December 1st, 1877, was Rs. 23,37,266: of the imports Rs. 15,95,274, and of the revenue of the irrigated taluks Rs. 10,44,982, that is, the exports by sea have increased in value 5 fold, the imports 3½ fold, and the revenue of the irrigated taluks 6 fold in value since the irrigation and navigation works came into operation.

10. Of the wealth that has thus poured into the two deltas, the mercantile community has of course absorbed by far the larger share, but the profits of the agricultural classes, especially during the past year, have been by no means inconsiderable. The price paid by the grain dealers and brokers to cultivators for paddy may be fairly assumed as one-half of the market rate (the Collector of the Godavari District thinks it must have been somewhat more than half), and on this assumption the equivalent of 250 lakhs of rupees in food or money must have been divided amongst the cultivators of the irrigated tracts.

The cost of cultivating an acre of rice is variously estimated at from Rs. 14–8–0 to Rs. 17–8–0, including land tax and water rate. Taking it at the higher figure and allowing Rs. 45 as the price paid to the cultivator for the produce of an acre, we have an average net profit of Rs. 27 8–0 per acre, the profit per acre, in ordinary years being probably about Rs. 12 or Rs. 15.

11. The remissions of the Government demand for land revenue form a very correct measure of the condition of a district during a year of drought. In the Godavari District where the irrigation works are nearly completed, the percentage of remissions on the gross demand of ryotwari revenue during 1876–77 was 1·9; in the Kistna District, of which the irrigation channels are still very incomplete, 15–6; in Chingleput and Bellary, which are dependent upon rain and tanks supplied from local sources, the percentages of remission were 70·4 and 61·4.

12. The Cauvery Irrigation Works in the Tanjore and Trichinopoly Districts are so entirely different in their character from those of the Godavari and Kistna, that I have purposely kept the discussion of their results apart. While the whole of the works in the Godavari and Kistna deltas are being carried out at the cost of the British Government, and aim at the economical distribution of the available supply on the most approved principles, besides providing inland navigation throughout the deltas, the works in the Tanjore and Trichinopoly Districts merely regulate in a more or less imperfect manner, the distribution, broadcast, over the surface of the country of the freshes in the Cauvery river. The water is for the most part turned into spill channels or artificial cuts of such antiquity as to have assumed the appearance of natural channels, while private interests and vested rights of the most virulent type start up on all sides to oppose any but the most cautious attempts to improve on existing arrangements. However it may fairly be urged that the results of existing arrangements are a sufficient warrant for not attempting much interference. The general statement showing the revenue due to irrigation in each district of the Madras Presidency for 1875–76 gives the following as the results for that year :—

| Districts. | Government Lands charged as Irrigated. | | | | | | | | | Inam and Zamindari lands charged as irrigated. | | Grand Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dry crops charged irrigated. | | Lands irrigated and charged as wet crops. | | Total charged as irrigated. | | Deduct. | | Remainder. | Inams paying quit-rent. | | | |
| | Area. | Assessment including charge for water. | Area. | Assessment including charge for water. | Area. | Assessment including charge for water. | Remissions on account of failure or excess of water. | Other remissions and usual deductions. | | Area. | Quit-rent. | Area. | Net assessment including charge for water. |
| | Acres. | Rs. | Acres. | Rs. | Acres. | Rs. | Rs. | Rs. | Rs. | Acres. | Rs. | Acres. | Rs. |
| Tanjore - | 8,022 | 26,021 | 773,557 | 38,33,222 | 781,579 | 38,19,243 | 51,709 | 2,49,758 | 36,17,776 | 129,906 | 78,577 | 911,485 | 36,96,353 |
| Trichinopoly - | 38,301 | 1,08,643 | 144,820 | 6,07,983 | 183,126 | 8,06,626 | 2,241 | 43,812 | 7,60,573 | 14,958 | 8,753 | 198,084 | 7,69,326 |
| Totals - | 46,328 | 1,34,664 | 918,377 | 45,91,215 | 964,705 | 47,25,869 | 53,950 | 2,83,570 | 43,78,349 | 144,864 | 87,330 | 1,109,569 | 44,65,679 |

It will be observed that the assessment on the land is included with the charge for water in the returns given by the Board of Revenue, but from what I was told by Mr. Puckle, the Superintendent of Revenue Settlements, I have no doubt whatever that the two could be separated with perfect ease and readiness for these two districts.

Calculations of interest upon outlay would be only misleading in the case of these works, of which the Capital Account includes no allowance for the labour expended, in some cases centuries ago, on constructing the various channels of distribution, such as they are. Lest, however, the finger of scorn should be pointed at the comparatively contemptible results of our more scientific irrigation works in other parts of India, I may remark here that the irrigation in Tanjore and Trichinopoly is the most slovenly that can well be imagined, that such a system is only possible with a superabundant supply of water, and that it would, if adopted in a less equable climate, soon make a very clean sweep of the population.

The remissions in Tanjore amounted to 5·5, and in Trichinopoly to 3·2 per cent. of the gross demand of ryotwari revenue during 1876–77.

13. From the statements showing the movement of food grains by sea and rail in Madras and Mysore from August 1st, 1876 to September 30th, 1877, lately published by the Madras Board of Revenue, the Godavari and Kistna Irrigation Works appear to me to have had a much more marked effect than those in Tanjore and Trichinopoly in mitigating the effects of the late famine.

During the above-mentioned period the net importation of food grains into the Presidency of Madras and Province of Mysore was 759,084 tons; the net exportation of food grains from places within the Madras Presidency amounted to 323,410 tons; the net exportation by sea from the Godavari and Kistna Districts was 141,748 tons; and by sea and rail from Tanjore and Trichinopoly only 67,869 tons. That is to say, the irrigation works in the Godavari and Kistna deltas, besides supporting the population of their own districts and a great crowd of hungry immigrants from the surrounding country, and besides exporting over country roads an amount of food grain which the Collector of the Godavari estimates at little less than the amount exported by sea, supplied very nearly one-fifth of the food grain imported during the worst period of the famine, and 44 per cent. of the food exported from places within the Madras Presidency itself for the supply of the famine demand during the same time. Tanjore and Trichinopoly, like the Kistna and Godavari, supported their own and all immigrant population, besides exporting by road, as well as by sea and rail, but only supplied, by these latter routes, 9 per cent of the food grains imported, and 21 per cent. of the grain exported from Madras ports between August 1st, 1876 and October 1st, 1877. It seems to me that schemes for extending and developing the Kistna and Godavari works deserve the heartiest support of the Government of India.

18-6-78.

HENRY A. BROWNLOW.

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## APPENDIX No. I.

STATEMENT showing approximately the increased Revenue due to Anicut Irrigation in the Godavari District for Fasli 1,286, 1876-77.

| District. | GOVERNMENT. | | | | | | Water-rate of Zemindari dry and Inam lands, exclusive of remissions. | Total amount due to the anicut. | TOTAL AREA IRRIGATED IN THE YEAR. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Increased security to Mamool wet calculated on the basis of remissions. | Assessment and water-rate of wet waste brought in, exclusive of remissions. | Water-rate of dry converted into wet and dry crops watered exclusive of remissions. | Assessment and water-rate of waste brought in, exclusive of remissions. | Miscellaneous. | Total. | | | Government. | Zemindari and Inam lands. | Total. |
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8 | 9. | 10. | 11. | 12. |
| Godavari - - - | — | *879,469 | 55,357 | — | 10,612 | 945,438 | 552,022 | 1,497,460 | 270,663 | 287,817 | 558,480 |

* The manner in which this figure has been arrived at is as follows:—

| — | As per jamabandy returns of Fasli 1,258 the year immediately preceding that in which Anicut irrigation commenced exclusive of upland wet. | | As per jamabandy returns of Fasli 1,286, exclusive of upland wet. | | Increase. | | Decrease. | |
|---|---|---|---|---|---|---|---|---|
| | Acres. | Assessment. | Acres. | Assessment. | Acres. | Assessment. | Acres. | Assessment. |
| Wet - - - | 77,423 | 242,590 | 233,311 | 498,507 | 155,888 | 255,917 | — | — |
| Dry - - - | 293,064 | 854,499 | 419,994 | 715,592 | 126,930 | — | — | 138,907 |

Increased wet assessment (*vide* column 3) - 255,917
Water-tax at 4 Rs. an acre on 155,888 acres - 623,552

879,469 This is the assessment and water-rate of wet waste brought in.

*N.B.*—The area of Fasli 1,258 is entered according to the accounts, and that of Fasli 1,286 is according to the survey.

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*Memorandum showing how the figure in column 3 has been arrived at.*

| | Acres. | Rs. | |
|---|---|---|---|
| Whole extent of wet land as per jamabandy accounts of F. 1,286 - - - | 286,308 | 6,97,757 | |
| Deduct extent of upland wet as per jamabandy returns. As this changes regularly, it is proposed that this be deducted - - - - - - - - | 52,997 | 1,99,250 | |
| Delta wet of F. 1,286 - - | 233,311 | 4,98,507 | A |
| Whole extent of wet land as per jamabandy accounts of F. 1,258, the year immediately preceding that in which anicut irrigation commenced - - - - | 127,280 | 4,07,085 | |
| As the accounts of F. 1,256 do not show the extent of upland wet, the following method has been adopted in finding out the same :— | | | |
| Upland wet area of F. 1,286 as per accounts - - - - - - | 52,997 | 1,99,250 | |
| Do do. F. 1,276 do. do. - - - - - - | 51,873 | 1,86,833 | (i.) |
| This is the year in which settlement was completely introduced. | | | |
| Increase in 10 years - - - - - - - | 1,124 | 12,417 | |
| Increase in one year - - - - - - - - - | 112 | 1,241 | |
| Increase in 18 years - - - - - - (ii.) - | 2,016 | 22,338 | |
| Wet area in F. 1,258 (substract (ii.) from (i.)) - - | 49,857 | 1,64,495 | |
| Deduct upland wet area of F. 1,258 from the total wet area of that Fasli, *i.e.*, net wet area of F. 1,258 after deducting upland wet - - - - - - | 77,423 | 2,42,590 | B |
| Deduct B. from A., the difference will give the extent and assessment of wet waste brought in since F. 1,258 - - - - - - - | 155,888 | 2,55,917 | |
| Water-rate at Rs. 4 an acre on 155,888 - - - - - - - | — | 6,23,552 | |
| Total assessment and water-rate of wet waste brought in - | — | 8,79,469 | |

## APPENDIX No. II.

STATEMENT by Channels showing the increased Revenue due to Kistna Anicut for Fasli 1,285 (1875–76).

| | Name of Channels. | GOVERNMENT. Increased security to Mamool wet calculated on the basis of remissions. | Assessment and water-rate of wet waste brought in, exclusive of remissions. | Water-rate of dry converted into wet and dry crops watered, exclusive of remissions. | Assessment and water-rate of waste brought in, exclusive of remissions. | Miscellaneous receipts. | Total. | Water-rate on Zemindari and Inams. | Total amount of revenue to be credited to anicut. | TOTAL AREA IRRIGATED IN THE YEAR. Government. | Zemindari and Inam. | Total. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Western Delta.* | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. | Acres. | Acres. | Acres. | |
| 1 | Main Canal | — | — | 14,288 | 499 | 85 | 14,872 | 2,473 | 17,345 | 3,722 | 599 | 4,321 | |
| 2 | Nizampatam Canal | 2,006 | 8,660 | 82,575 | 16,512 | 821 | 1,10,574 | 10,212 | 1,20,786 | 33,229 | 4,283 | 37,512 | |
| 3 | Bank Canal | 3,706 | 9,362 | 19,277 | 10,973 | 664 | 43,982 | 3,995 | 47,977 | 16,975 | 2,428 | 19,403 | |
| 4 | Kommamúr Canal | 3,065 | 69,243 | 48,886 | 32,515 | 2,507 | 1,56,216 | 10,495 | 1,66,711 | 35,055 | 5,772 | 40,827 | |
| | *Eastern Delta.* | | | | | | | | | | | | |
| 5 | Masulipatam Canal | — | — | 17,444 | — | 289 | 17,736 | 30,160 | 47,896 | 4,422 | 14,427 | 18,849 | |
| 6 | Pulleroo Canal | 1,141 | 73,946 | 44,788 | 26,233 | 1,867 | 1,47,975 | 34,322 | 1,82,297 | 37,532 | 35,961 | 73,493 | |
| 7 | Ryves „ | 106 | 6,507 | 37,558 | 7,423 | 439 | 52,033 | 36,572 | 88,605 | 12,378 | 17,677 | 30,055 | |
| 8 | Ellore „ | 7,493 | 62,166 | 10,601 | 20,544 | 4,868 | 1,11,672 | 8,450 | 1,20,122 | 25,555 | 14,241 | 39,796 | |
| | | 17,517 | 2,29,884 | 2,81,420 | 1,14,699 | 11,540 | 6,55,060 | 1,36,679 | *791,739 | 168,868 | 95,388 | 264,256 | |

| | Rs. |
|---|---|
| *Kistna District | 7,54,982 |
| Godavari ditto. | 36,757 |
| | 7,91,739 |

## APPENDIX No. III.

STATEMENT showing AREAS of RICE and GARDEN CROPS watered on GODAVARI CANALS.

It has been found too much to take the average of villages as I thought of doing, and there was more in the accounts of my office than I thought there was about the crops. The Zemindari villages and Inam lands have no accounts to show some of the items; but the Government land account is tolerably correct.

*Government Lands.*

| | Acres. |
|---|---|
| Area entered in accounts as wet irrigated by Godavari Canals | 233,640 |
| Area entered in accounts as wet irrigated by Kistna Canals in this district | 11,034 |
| | 244,674 |
| Of this, the extent of waste charged is | 5,333 |
| Total actually cultivated wet | 239,341 |
| Garden crops | 11,610 |
| Cocoa-nut trees, whole area 6,614; these will only be watered for about one-fourth of their lives | 1,653 |
| | 13,263 |
| Remainder rice | 226,078 |

*Zemindari and Inam Lands.*

| | Acres. |
|---|---|
| Area entered in accounts as wet irrigated by Godavari Canals | 256,958 |
| Area entered in accounts as wet irrigated by Kistna Canals in teis district | 5,554 |
| Of this, the extent of waste charged is | 262,512 |
| Unknown, but believed to be too small to mention | — |
| Total actually cultivated wet | 262,512 |
| Inam 4844. Zemindari unknown; taking same proportion for Zemindari and Inam as in Government lands | 12,415 |
| Cocoanut, whole area 11,486 | 2,871 |
| | 15,286 |
| Remainder rice | 247,226 |

(Signed) W. S. FOSTER,
Collector.

*Abstract of Crop Register of Kistna Canals for* 1876-77.

| | Acres. | Remarks. |
|---|---|---|
| First crop | 206,008 | Rice. |
| Second crop | 182 | Mostly rice. |
| Irrigated free | 22,223 | Do. |
| Godavari irrigation in Kistna district | 15,174 | Do. |
| Total | 243,587 | |
| Deduct | 87 | Garden crops. |
| Balance | 243,500 | Of which almost the whole is rice. |
| Dry crops watered | 19,585 | |

## Memorandum on Wells in the Cuddapah District, and their Use as a Preventative against Famine, by Mr. J. D. Gribble.

1. I regret that there has been so much delay in submitting this memorandum, called for by the president of the Famine Commission in February last. The necessary information, however, was not available in the collector's office, nor indeed in the taluqs, and had to be collected from each village over an area of nearly 8,367 square miles. Even now the information is not complete for the whole district, but I do not wish to delay the report any longer.

2. This district is divided into two natural halves, one smaller and the other greater; which are perfectly distinct in soil, climate, and products. The main division consists of seven taluqs spread over an area of 4,793 square miles, whilst in the sub-division there are four taluqs with an area of 3,574 square miles. The taluqs of the main division are all situated below the ghauts. Three of the taluqs (Jammalamdugu, Proddatur, and Pulivendala) and a portion of a fourth (Cuddapah) consist for the most part of rich black cotton soil, in which cultivation by irrigation is not only little practised, but is not so profitable as the cultivation of cholum (millet) and cotton, dependent only on the rainfall. Irrigation is only practised where the black cotton soil is mixed with a lighter soil, and in such places where no tanks have been constructed there is much irrigation under wells. The remaining taluqs of the main division, Pullampett, Badvel, Sidhour, and a portion of Cuddapah, consist for the most part of rich valley land. In these taluqs irrigation is used wherever available, and there is considerable cultivation under tanks as well as wells.

3. The sub-division is situated entirely above the ghauts. It is separated from the main division by a range of hills about 2,000 feet to 3,000 feet above the sea. It consists of four taluqs, the elevation of all of which ranges from 1,200 feet to 2,500 feet above the sea. The lowest portion is at the western foot of this range of hills (known as the Palkonda) and the remainder of the sub-division gradually rises in elevation towards the west, until, on the boundaries of the Madanapally taluq, it merges into the Mysore plateau. The four taluqs of the sub-division are very much more broken up into hills and valleys than is the Mysore plateau. These hills are, for the most part, bare rock, and often consist of huge boulders of granite. The soil in the plains is very light except in the narrow valleys, where there is a great deal of rich alluvial soil washed down from the decomposed granite of the hills; but wherever the valley is broader or there is any expanse of level ground, the soil is very light and gravelly. In this soil irrigation is largely made use of, and wherever it is possible to do so a tank has been constructed. These tanks are in strings one below the other, the first being small and the others increasing in size as they are constructed down the catchment basin. There are, altogether, 3,679 tanks in the sub-division, of which, however, 1,981 irrigate less than 10 acres, 1,451 between 10 and 70 acres, and only 247 above 70 acres. There are besides a number of small tanks of which no account is kept, as they have no registered irrigable land. The majority of these tanks are, therefore, very small and insignificent. In addition to these tanks there is in the sub-division a large number of wells from which land, independent of the tanks, is irrigated.

4. Wells may be broadly divided into two classes, wells in dry and wells in wet lands. Dry lands may be defined as lands which are not commanded by any Government tank, channel, or other source of irrigation. Wells in such lands irrigate, therefore, fields which without them would receive no irrigation whatsoever from a Government source. In former days, when land was assessed according to its produce and not according to its nature, a field irrigated from a well paid, equally with a field irrigated from a Government source, a wet land assessment. Hence the lands under the greater number of the wells in the district were formerly classed as wet or garden lands, and paid an assessment as high and sometimes higher than wet lands irrigated from a tank or channel; and this, irrespective of whether the wells had been dug by private individuals or not; indeed, it may be safely said that not one out of 100 of the old wells in the district was ever excavated at Government (past or present) expense. Within the last 9 or 10 years there were numerous wells in the district that paid an assessment of from Rs. 24 to Rs. 30 per acre; and when it is remembered that the cost of production under a well (where bullocks have to be bought and maintained, gear kept in order, and servants employed) is necessarily greater than under a tank or channel, from which the water flows on to the ryot's fields without expense or labour, it will at once be seen that this charge was a very high one. Still the assessment was paid, and a profit was made out of the fields. Land under wells has always been held to be valuable property, because, though the assessment was high, the water supply was certain. It will at once be seen that the expenditure connected with a well, viz., the cost of digging, the cost of maintenance of cattle, instruments, and labour, and finally the cost of assessment, puts it out of the power of a petty ryot without capital to construct a well. (The original cost of a well may be put down at from Rs. 300 to Rs. 500, according to the nature of the soil). Hence it comes that, though wells are so valuable, and though, as I shall show hereafter, water is generally easily obtainable, comparatively so few wells have been dug. Under orders from Government in 1869 the assessment on old wells was reduced to the highest dry rate of the village, and when the present settlement has been introduced throughout the district there will be few, if any, wells in the main division which pay over Rs. 5 per acre, or in the sub-division over Rs. 3. Still this is a high rate when compared with land which receives an easy irrigation from anicuts like those of the Cauvery, the Kristna, or the Godavery, and which pay a smaller assessment. I do not, however, advocate the reduction of assessment on these wells. They have paid a higher assessment with profit, and they can afford to pay the present greatly reduced assessment with still more profit; any further reduction would be a needless sacrifice of revenue.

5. Since 1857 no extra charge has been made for improvements effected by the ryot himself, and the consequence is that a lage number of private wells now exist, which pay an assessment according to the class of land they irrigate. The figures for 10 out of 11 taluqs in the district show that there are 22,032 private wells irrigating 96,312 acres. In the remaining taluq there cannot be less than 3,000 wells irrigating about 15,000 acres, or a total of, say, 25,032 private wells irrigating, say, 111,312 acres. The out-turn under these wells may be taken as 1,500 lbs. per acre (see Appendix C., where this point is worked out from figures of actual well calculation collected by myself); and assuming the native all round calculation to be tolerably correct, that 600 lbs. furnish food sufficient for an adult for a year, these wells provide enough food for 278,280 adults. There are, however, besides private wells, in the same 10 taluqs 13,814 Government and dusbandham wells (the latter term refers to a peculiar tenure in which a proportion of the cultivation is not charged for on condition that the ryot keeps the well in order) with an irrigable area of 38,108, and an average assessment in the main division of Rs. 5-11-9, and in the sub-division of Rs. 4-14-8. The taluq for which figures have not been obtained will have not less than 1,000 more of these wells with an irrigable area of, say, 5,000 acres, or a total area under Government and dusbandham wells of, say, 43,108 acres, sufficient under the above calculation, to feed 107,770 adults. The crops grown under wells are, generally speaking, food crops. The actual cultivation under all these wells during the present year is in the 10 taluqs above mentioned 114,232 acres, or 20,188 less than the whole irrigable land under them, and for the whole 11 taluqs the actual cultivation will probably be 131,000 acres, or sufficient to feed 327,500 adults for a year.

6. It is alleged that since 1857, when ryots were allowed the benefits of their own improvements, 6,982 wells have been dug. These wells are included in the above figures, but I am by no means prepared to say that the figures are perfectly correct. It is, however, certain that the number of wells has by no means so rapidly increased as one would have supposed. This is not owing to the difficulty of obtaining water. During the six years that I have been in the district I have dug numbers of wells over all parts of the sub-division, and only in one instance, where I came upon rock, have I failed to find water within 15 feet to 18 feet from the surface. During the famine year I never had to dig more than 20 feet without finding water, and frequently very strong springs. In the main division, which is lower, water is even more easily accessible, and the springs are stronger, as will be seen by the larger area which wells in the main division are able to irrigate as compared with those in the sub-division; the average in the former being 5 acres, and in the latter about 1¼ acres. In one taluq in the main

division, the other day, I came across a well which irrigates 2¼ acres, and which I was assured irrigated the the whole of this extent during the height of the famine. I was informed that there are several other instances of wells irrigating an equal extent. The principal cause which prevents the extension of well cultivation in dry land is, no doubt, the want of capital for the cost of excavation and for the maintenance of cattle. During the famine year I constantly saw three pairs of bullocks employed on one well in lifting the water, the lift being the ordinary *kapella* or leather bucket. Another cause I believe to be the want of a fixed tenure. It is true that the ryot cannot be ejected as long as he pays his assessment, but still, the settlement is only for 30 years. It may be considered that I lay too much stress upon this point, but whether I do or not, I believe that no revenue officer will deny my assertion that the ryots almost always spend what capital they have on inam or rent-free lands in preference to ryotwaree lands. A man having two holdings, one of a few acres of personal inam land, from which he probably will not be ejected, because the quit-rent is easily payable and cannot be raised, and another holding (equal in size) of ryotwaree land, from which he has more chances of being ejected because the assessment is high, and may possibly (though improbably) be raised 30 years hence, improves his inam land by digging wells, and generally leaves his ryotwaree land unimproved. This fact, I maintain, proves the truth of my opinion. Another objection as regards the black cotton taluqs is the unsuitability of the soil for irrigation; this objection, however, only applies to portion, a large portion it is true, of a few, 3½, of the 11 taluqs. These taluqs, too, are the richest in the whole district, and in none of them was the famine so severely felt as in the taluqs where the soil is lighter, and where every drop of water it valuable.

7. The total population of the district is, according to the census of 1871, 1,351,194, and of these during the famine probably 350,000 depended entirely on food brought from elsewhere, that is to say, there was not in the district food for 350,000. The present number of wells in dry land, say 39,796, are now actually irrigating enough land to produce food for 327,500 adults, and it may therefore be assumed that 42,530 more wells distributed over the country would grow food sufficient for 350,000 additional adults; 42,530 more wells would, therefore, have produced enough food during the famine year for the requirements of the district. The question, however, is, how to construct these wells? The cost of 42,530 wells, at an average price of 35*l.* (or Rs. 350) each, would be 1,488,550*l.* (or Rs. 14,885,500). There are only two ways of getting these additional wells constructed, either by the ryots themselves or by Government. If the ryots are left to themselves it would at the present rate (6,982 in 22 years) take nearly 120 years, during which time there might be a dozen famines costing 500,000*l.* each. A great deal might be done by aiding the ryots in the shape of advances, of promising a freehold tenure on payment of a nominal quit-rent, but even then the progress would be but slow. The advances should, I think, be made payable over long instalments, and should bear no interest; in fact, everything should be done to induce the ryots to dig wells in dry lands; but even if all these inducements are given, I doubt whether in 10 years there would be as many thousand additional wells. The remaining course is for the Government to step in and to dig them. The idea is a novel one: the Department of Public Works have hitherto had nothing to do with wells as a source of irrigation; the cost for one district alone would be enormous, and what is wanted for one district would probably be required for many others, and before the Presidency could be said to be famine-proof perhaps an expenditure of 20,000,000*l.* would be required. But if the figures I have given are examined a little more closely, it will be seen that it is by no means a financial impossibility. 42,530 wells would probably be able from one year to another to irrigate 127,590 acres. The average rent paid at present by Government and dusbandham wells is about 5 rupees per acre. This would give a return of 637,950 rupees, or 4½ per cent, on an outlay of 1,488,550*l.* (or, Rs. 14,885,500). But were all these wells built, there would, on occasion of a year like 1876 77, be probably great distress, and it is quite possible that relief works would be necessary. It must, however, be borne in mind that with 42,530 wells at work, each employing at least two and some three labourers, there would be at least 100,000 fewer applicants for relief. In ordinary years there would be no remissions; for, unlike a tank, which has only a precarious water supply, a well has a certain one, and lastly it is quite possible that a considerable portion of the capital would be recouped by the sale of the irrigable lands. Well lands are always eagerly sought for and have always a market price. Well land at present fetches from Rs. 40 to 50 per acre. Assuming, however, that these new well lands sold for only Rs. 20 per acre, about 255,180*l.* (or Rs. 2,551,800) of the original outlay would be recovered. Deduct this amount from the original outlay (1,488,550*l.*) and the scheme would give a return of 63,795*l.* on an outlay of 1,233,370*l.* or say 5 per cent. One expense there must necessarily be, and that is the expense of the supervision. I can, however, see no reason why the engineers should not be able to supervise wells as well as tanks, and would probably be able to do so effectually with a slightly increased subordinate establishment. Another objection that may reasonably be urged is whether there are sufficient cattle to meet the additional lift requirements. To this objection I have two answers: (1.) that in course of time the supply would properly meet the demand, and (2.) that every endeavour should be made to induce the ryots to adopt a more economical lift than the one they now use. The double mote in use at the experimental farm at Madras brings up nearly double the quantity of water by means of one bullock instead of two, and it can be erected over any well at a cost of Rs. 50 to 75. I have myself introduced two or three of these motes into the sub-division of this district, but the ryots on all sides require to be shown their use and value before they can be generally introduced.

8. Another point of importance is, where are these wells to be dug? To this I reply, in suitable sites in land now lying waste, and in dry lands now in occupation. There are few ryots who would object to a well being dug in their puttah lands, even though they would become liable to pay a higher rent and to contribute towards the purchase value of the land commanded by it. If they were not willing there would be many others who would be, and in a matter of such grave importance, where the object is to provide a safeguard against famine, there could I conceive be no objection to the acceptance of these wells being made compulsory upon the landholders. There is, however, so much waste land throughout the district that I feel no doubt that a very large number of good sites could be found in land lying waste. There are also a large number of old sites available, sites which are now classed under the head of ruined wells. Of these there are a very large number: I have not been able to collect correct figures for the whole district, but in the one taluq of Kadiri, a fair example of the sub-division, there are as many as 1,399 ruined wells. I have little doubt that there are in the whole district from 8,000 to 10,000 of these ruined wells. There are wells which have fallen into disrepair, owing to the revetment having fallen in, the springs having become choked, &c., &c.; the land which they formerly commanded is generally still available, and a comparatively small expenditure would in the majority of cases suffice to put them into good working order.

9. I must confess that, until the famine occurred, I had no conception of the value of wells as a means of irrigation. It is from what I saw during that time that the idea has gradually grown upon me. One portion of country I particularly remember. It was in Kadiri, one of the taluqs of the sub-division which suffered most. The month was February 1877, when the famine was being felt at its worst. There was not a drop of water in any tank or channel, and the whole country was a burnt-up waste. Suddenly I came across a broad valley, through which the high road ran, which was, comparatively speaking, a perfect garden of cholum (millet) and raggy crops. The cholum was the height of a man, with large heavy cobs just ready for reaping. These crops were entirely raised under wells, and extended for more than five miles on both sides of the road. When I passed out of this belt to a part of the country where there were no wells, the country was the same dry arid waste that it had been before. Nor was this the only place where I noticed the same result. It was here more marked, because the number of wells was larger; similar cultivation, however, was to be seen wherever there was a well. I may safely say that during the season 1876-77 there was scarcely an acre of cultivation (except under a few of the largest river channels) which was not dependent upon a well. Had it not been for the comparatively few wells that we have, the famine would have been far more intense than it was.

10. I have been asked by the Famine Commission to state what, in my opinion, would be a preventive of famine in the future. Digging fresh tanks and channels will benefit the country in ordinary seasons, but they are of no good to prevent a famine when they contain

no water and there is no rain to fill them. The irrigation canal was certainly of vast use in the taluqs (three) through which it runs, but in the greater part of the district the hilly nature of the soil prevents the digging of canals, even without the disadvantage that in all the poorer taluqs, where famine is most felt, there are no rivers to feed them. Promotion of the growth of forests may possibly affect the rain-fall; experts seem to differ on the subject; but any progress in this respect must needs be slow, and would probably not be effectual. A sufficient number of wells, however, would, in my opinion, be a certain preventative; prices might rise, there might be distress, and relief in some degree might be necessary, but there would be sufficient food raised in the district, even during the dryest season, to feed the inhabitants, and an actual famine would be averted.

11. I have hitherto only spoken of wells in dry land; there still remain about 8,000 wells in the district which are termed wet wells, which pay a full wet assessment on all lands they irrigate. Without explaining the technical names of itafâk, dorovoo, &c., I may broadly say that whenever a well is so constructed that it is supposed to derive its supply from a river, a channel, or a Government source, the land under it is treated as ordinary wet land, and pays a wet and double crop assessment, even although the well may have been built by private enterprise. Hence all wells in river beds within 10 yards of a river or tank bank, and all wells situated in lands commanded by and irrigable from a Government tank or channel, are classed as wet wells, and pay a wet assessment, minus only a deduction of 1 rupee per acre for lift. It is supposed that such wells get their supply by means of percolation, and therefore, as they derive their benefit from Government water, they are in justice bound to pay for this benefit. As regards our rivers I think this rule unjust. The water which these wells take causes no loss to anyone; there are still millions of gallons which empty themselves unutilised into the sea, and it is so important that a well should be constructed wherever possible that, as long as such a well is constructed from private capital, I would impose no extra assessment on it. As regards wells near channels I am in doubt. All channel water flows eventually on to some field, and every drop is required. Wells of this description are, however, very few in number, and do not affect the consideration of the question at all. As regards wells in lands commanded by and irrigable from Government tanks or channels, I have no hesitation in saying that I consider any charge on them not only unjust but impolitic. We should rather encourage than tax them. It is urged that they get their supply by percolation from the tank itself, even though that be 100 yards or more distant. How then did it happen in the famine year, when every tank in the district was dry, that what wet cultivation there was was carried on by means of these wells? There could have been no percolation then. Still every acre irrigated by such a well would have paid assessment during the famine year just as if the tank had received a full supply, had it not been on account of a special order which gave but partial relief, by substituting the highest dry rate for wet assessment; the highest dry rate in most villages varying from Rs. 3-0-0 to Rs. 5. As regards the owners of these wells, this was not probably felt to be a hardship, because the price of grain was so high that they made enormous profit, but the fact that such a rule exists must ordinarily act as a prohibition against further construction. The fact is that wells and tanks obtain their supply in different ways; the tanks from surface drainage, and the wells from sub-soil drainage, which the tanks do not touch. It is, however, urged that by retaining the water the tanks serve to keep the ground moist and so help to feed the wells. This is true to a certain extent, but not entirely so, as is shown (1.) by the wells having a supply, not only long after the tanks are dry, but also when, as in the famine year, they received no supply at all, and (2.) by the wells never being used, except until after the supply from the tank has ceased, or else to lands which the tank sluices do not command. These wells are dug by the ryots in drainage basins, not only because the tanks are there, but also for the same reason that tanks are constructed in drainage basins, because water is easily available; to a tank from the surface drainage and to a well from the sub-soil drainage. Even were there no tanks, there would probably be wells in these places. It is, however, still a fact that these wells are dug to aid the tanks, and to ensure a supply when the tank water fails. It has been objected to me by an experienced settlement officer, to whom I broached this idea, that if no charge were made on water taken from these wells, the ryots would take water from them only, and leave the tank water unused. This I do not believe, and for this reason, water can only be taken from these wells by lift, and the cost of lift for one month is more than the water-rate which a ryot would pay for tank water for a whole year. Therefore these wells will only be used when the tank water fails. Not only in famine years, but also in ordinary years, does the tank water frequently fail. This is especially the case in the sub-division, where there are, as above enumerated, so many tanks. These tanks are small; and unless they are filled, some twice, and some three or four times over, they cannot retain sufficient water to irrigate the lands situated under them. It is, however, seldom the case in even the best seasons that all the tanks receive a full supply several times over; some do so one year and others another, and in every year under the majority of the tanks the well will, towards the close of the season, be brought into work. There will often be enough water in the tank for one crop, and the water for the second crop will be supplied from the well. In this case the second crop will be paid for in the same way as if it had received tank water, with a reduced rate for the sub-division, which is a quarter instead of a half of the assessment, with a maximum limit of Rs. 3. Again, a well may be dug in land commanded by a tank or a channel, and it may be possible to take water from this well to land which the tank cannot command. In this case the land so irrigated will pay a full wet assessment, just as if it had used tank water, and if a second crop is raised, it will also pay a second crop assessment, subject to the above modification. In my opinion, the Government are only justified in charging a water-rate when water is furnished from a Government source of irrigation, without which water would not be available. It is, therefore, in my opinion, unjust to charge these wells when they irrigate lands which the Government source can no longer supply, or when they take water to fields which, under no circumstances, the Government tank could command. It is also impolitic, because a charge of this kind acts as a prohibition against the construction of more wet wells, and what we ought to do is to encourage their excavation as much as possible. Had there been double the number of wells under Government tanks or in drainage basins, we should have had double the amount of crops during the famine year. I am inclined to think that the only inducement required for encouraging the digging of wells in wet lands is the abrogation of the rule that a charge will be made if water is taken from them. Water is obtainable in these drainage basins at no very great distance from the surface, and the excavation of a well costs far less in this alluvial soil than it does in the dry uplands. It is probable also that if the numbers of these wells were increased and no charge made, additional land at present uncommanded by the tanks would be brought under cultivation, and, as this land is generally of a richer nature than the uplands, there would be an increase to the Government from dry assessment, in addition to the certainty the ryots would gain of being able to raise crops, however bad the season might be.

A statement is annexed to this memorandum (Appendix A.) showing the number of wells in 10 taluqs, their irrigable area, actual cultivation this year, and the average assessment per acre. The calculations I have made for one taluk* are not purely by guess, but I have been guided by calculations made and information collected during the preparation some years ago of the district manual. The totals may not be exactly accurate, but the difference either way will be but slight. I have, in each case where I have been guided by former calculations, rather under than over estimated. The one taluq remaining is the most important one in the district as regards wet cultivation under tanks, channels, and wells. The statement does not include ruined wells, of which there are a large number, but I have been able to give the number† of ruined wells for one taluq only—Kadiri, which is a fair example of the four taluqs of the sub-division.

* The information has since been received, and the following are the actual figures:—

| | No. of Wells. | Ayacut. | Cultivation for this Year. |
|---|---|---|---|
| | | Acres. | |
| Private - - | 2,280 | 16,059 | 15,653 |
| Sircar and Dushandum - | 1,217 | 7,498 | 6,741 |

The actual figures differ so slightly from my estimate that I have not thought it worth while to alter all the calculations.

† 1389.

## Note on Wells in Cuddapah by Mr. H. S. Cunningham.

1. The Collector of the Cuddapah* district urged this subject upon the Commission. The district is over 8,000 square miles in area; of its population, 1,351,000, no less than 350,000, or nearly 25 per cent., were dependent, during the recent famine, on imported food. The present number of wells in lands otherwise without irrigation is 39,796, and the area which is this year under well-irrigation produces food enough to support 327,500 adults. The collector reckons, accordingly, that 42,500 additional wells would have produced food enough for the 350,000 people who had in the famine to be fed on imported supplies. The cost of these 42,500 wells, at 35*l.* apiece, would be 1,488,000*l.* During the last 22 years the ryots have, on their own account, constructed less than 7,000 wells, so that there is no likelihood of private enterprise doing anything, within any reasonable period towards a material increase in the number of wells; though it is possible that by offering advances freely, at a low rate of interest, and making the loan repayable only after a considerable period, some stimulus might be given by Government in this direction. As to State aid, there are some grounds for supposing that the outlay, even apart from the saving in famine relief, would not be remunerative to Government. The 42,500 wells would irrigate 127,000 acres. The average rent paid at present on Government wells is about Rs. 5 per acre; this would give a return of Rs. 637,950, say 63,790*l.*, or 4½ per cent. on a capital outlay of 1,488,000*l.* In addition to this would be the saving of remissions in years of drought, and, in case of a year like 1876-77, at least 100,000 less people in the receipt of State relief.

2. Three taluks only out of 11 are within reach of the Madras Irrigation Company's canal, and most of the district is too hilly for canals, even if the rivers for their supply existed, which, in the poorer taluks, where famine especially prevails, is not the case.

Irrigation is practised wherever the soil is light and gravelly: in the black cotton soil crops dependent on rainfall are most profitable, and resort is not had to irrigation.

The profits from well-irrigated lands must be considerable: some such lands used a few years ago to pay from Rs. 24 to Rs. 30 per acre revenue, and yet gave a profit to the cultivator. In 1869 the assessment on old wells was reduced to the highest rate charged for unirrigated land in the village; when the present settlement is introduced, Mr. Gribble says, there will be few wells paying over Rs. 3 to Rs. 5 per acre. Since 1857 no additional assessment has been charged on improvements effected by the cultivator, and many private wells have been constructed, the lands under which pay no additional assessment. There are, say, 25,000 private wells, irrigating 111,000 acres. The out-turn of this area may be taken at 1,500 lbs. per acre, so that, taking 600 lbs. as the food of an adult for a year, it produces food enough for 278,000 adults. Besides these there are about 14,000 Government wells, irrigating an area of 43,000 acres, on which food for 107,000 adults is raised. Of this total area of 154,000 acres, in the present year about 131,000 acres, or enough to feed 327,500 adults, are under actual cultivation. In addition to this 39,000, there are 8,000 wells which are supposed to derive their supplies from Government sources, and the lands under which, accordingly, are assessed at a full irrigation rate.

3. During the six years that the collector has known the district he has dug numbers of wells in every part of the district, and never, except on a single occasion, failed to come to water within 15 to 20 feet; during the famine year he invariably found water within 20 feet, frequently very strong springs. In one division of the district, which is lower, water is even more accessible and the springs are stronger, a well on an average sufficing to irrigate 5 acres, and in one instance the collector found a well which had irrigated 24 acres all through the famine.

4. The collector feels no doubt that abundant sites for wells might be found in the waste lands of the district, and that the cultivators would gladly welcome the construction of wells on their holdings. There are, moreover, 8,000 to 10,000 ruined wells, which have fallen into disrepair owing to revetments falling in, springs having become choked, &c.: a comparatively small outlay would suffice to restore them to working order.

### *Assessment of Well Irrigation.*

The collector of Cuddapah draws attention to a rule as to the assessment of some well-irrigated lands which appears to require consideration. The ordinary rule is that no additional assessment is charged in respect of wells constructed by a cultivator; to this an exception is made in the case of wells which from their locality are supposed to derive their supplies from Government tanks and channels. Such wells are chargeable with this assessment, even though there is no water in the tank. They are dug to supplement the tank and ensure a supply when the tank fails,—an event of no unusual occurrence. Sometimes the tank will suffice for one crop, and the second is dependent on the well; in this case it seems hard that the second crop should have to pay, as it does as the rule stands, an assessment, not indeed so high as that for the first crop, but still considerably in advance of the unirrigated rate. Sometimes, again, a well is dug in land commanded by a Government irrigation work, and the water taken to land which the Government work does not command; and the land thus irrigated is charged with the irrigation assessment; this, again, operates as a discouragement to well-construction. The collector urges that the obvious policy of Government is to encourage the multiplication of wells, as thereby more land would be brought into cultivation and the land revenue on them increased.

H. S. C.

* Memorandum on wells in the Cuddapah district, by J. D. Gribble.

## APPENDIX A.

STATEMENT showing the Number of WELLS, their AYACUT and CULTIVATION, in Ten out of the Eleven Taluks in the District of CUDDAPAH.

| Serial Number. | Names of Taluks. | Description of Wells, whether Sircar, Dasabundham, or Private. | Number of Wells. | Ayacut. | | | | Cultivation of Fasli 1288. | | | | Rate per Acre. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total Ayacut. | | Average Ayacut. | | Total Cultivation. | | Average Cultivation. | | |
| | | | | Extent. | Assessment. | Extent. | Assessment. | Extent. | Assessment. | Extent. | Assessment. | |
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
| | | | | Acs. | Rs. | Acs. Cts. | Rs. A. P. | Acs. | Rs. | Acs. Cts. | Rs. A. C. | Rs. A. P. |
| 1 | Badvel | Sircar | 848 | 3,242 | 9,277 | 3 82 | 10 15 0 | 3,057 | 8,466 | 3 60 | 9 15 8 | 2 12 3 |
| | | Dasabundham | 100 | 527 | 2,497 | 5 27 | 24 15 6 | 488 | 2,260 | 4 88 | 22 9 9 | 4 10 1 |
| | | Private | 1,310 | 7,108 | 9,243 | 5 42 | 7 0 10 | 6,079 | 8,681 | 4 64 | 6 10 0 | 1 6 10 |
| | | | 2,258 | 10,877 | 21,017 | 4 83 | 9 4 11 | 9,624 | 19,407 | 4 26 | 8 9 6 | — |
| 2 | Proddatur | Sircar | 46 | 191 | 793 | 4 15 | 17 3 9 | 191 | 793 | 4 15 | 17 3 9 | 4 2 5 |
| | | Dasabundham | 148 | 907 | 6,302 | 6 12 | 42 9 3 | 827 | 5,919 | 5 58 | 39 15 10 | 7 2 6 |
| | | Private | 1,695 | 12,588 | 18,456 | 7 42 | 10 14 2 | 11,693 | 17,235 | 6 89 | 10 2 8 | 1 7 7 |
| | | | 1,889 | 13,686 | 25,551 | 7 24 | 13 8 5 | 12,711 | 23,947 | 6 73 | 12 10 10 | — |
| 3 | Jammulamadugu. | Sircar | 671 | 3,875 | 9,849 | 5 78 | 14 10 9 | 3,472 | 8,980 | 5 17 | 13 6 1 | 2 9 4 |
| | | Dasabundham | 36 | 233 | 1,550 | 6 46 | 43 0 10 | 207 | 1,417 | 5 75 | 39 4 0 | 6 13 6 |
| | | Private | 1,139 | 5,650 | 6,466 | 4 89 | 5 10 0 | 5,240 | 6,002 | 4 59 | 5 4 3 | 1 2 3 |
| | | | 1,846 | 9,758 | 17,865 | 5 28 | 9 10 10 | 8,919 | 16,399 | 4 83 | 8 14 1 | — |
| 4 | Pulivendala | Sircar | 551 | 3,869 | 10,562 | 7 2 | 19 2 8 | 3,174 | 8,543 | 5 76 | 15 8 0 | 2 11 0 |
| | | Dasabundham | 409 | 2,375 | 15,746 | 5 80 | 38 7 11 | 1,955 | 13,032 | 4 77 | 31 13 0 | 6 10 7 |
| | | Private | 1,602 | 13,046 | 11,313 | 8 14 | 7 0 11 | 11,985 | 10,465 | 7 48 | 6 8 6 | 0 13 11 |
| | | | 2,562 | 19,290 | 37,621 | 7 53 | 14 10 11 | 17,114 | 32,040 | 6 68 | 12 8 1 | — |
| 5 | Royachoty | Sircar | 699 | 1,000 | 5,459 | 1 43 | 7 12 11 | 82 | 279 | 0 11 | 0 6 4 | 3 6 5 |
| | | Dasabundham | 2,765 | 6,233 | 51,709 | 2 25 | 18 10 8 | 4,782 | 30,208 | 1 72 | 10 14 9 | 6 5 0 |
| | | Private | 2,449 | 5,264 | 6,470 | 2 14 | 2 10 3 | 5,170 | 5,743 | 2 11 | 2 5 6 | 1 1 9 |
| | | | 5,913 | 12,497 | 63,638 | 2 11 | 10 12 2 | 10,034 | 36,230 | 1 69 | 6 2 1 | — |
| 6 | Kadiri | Sircar | 1,432 | 3,699 | 7,758 | 2 52 | 5 6 8 | 2,281 | 3,095 | 1 59 | 2 2 6 | 1 5 8 |
| | | Dasabundham | 2,031 | 4,743 | 37,158 | 2 33 | 18 4 8 | 3,330 | 26,479 | 1 63 | 13 0 7 | 7 15 2 |
| | | Private | 3,271 | 11,298 | 5,789 | 3 44 | 1 12 3 | 9,855 | 5,161 | 3 1 | 1 9 1 | 0 8 4 |
| | | | 6,734 | 19,740 | 50,705 | 2 93 | 7 8 5 | 15,466 | 34,735 | 2 29 | 5 2 6 | — |
| 7 | Voilpaud | Sircar | 681 | 785 | 1,439 | 1 15 | 2 1 9 | 496 | 892 | 0 72 | 1 4 10 | 1 12 9 |
| | | Dasabundham | 2,031 | 3,231 | 26,927 | 1 59 | 13 4 1 | 2,498 | 21,486 | 1 22 | 10 9 3 | 8 9 7 |
| | | Private | 2,190 | 4,338 | 2,718 | 1 97 | 1 3 10 | 3,410 | 2,282 | 1 55 | 1 0 8 | 0 10 8 |
| | | | 4,902 | 8,349 | 31,084 | 1 70 | 6 5 5 | 6,404 | 24,660 | 1 30 | 5 0 6 | — |
| 8 | Madanapalle | Sircar | 215 | 435 | 1,728 | 2 3 | 8 0 7 | 236 | 760 | 1 80 | 3 8 6 | 3 3 6 |
| | | Dasabundham | 772 | 1,589 | 10,933 | 2 6 | 14 2 7 | 1,203 | 8,054 | 1 55 | 10 6 11 | 6 11 1 |
| | | Private | 1,892 | 4,910 | 3,499 | 2 65 | 1 13 6 | 3,743 | 2,807 | 1 98 | 1 7 7 | 0 12 0 |
| | | | 2,879 | 6,934 | 16,160 | 2 40 | 5 9 9 | 5,182 | 11,621 | 1 10 | 4 0 7 | — |
| 9 | Sidhout | Sircar | 320 | 960 | 5,850 | 3 0 | 18 4 6 | 770 | 4,800 | 2 40 | 15 0 0 | 6 3 9 |
| | | Dasabundnam | 16 | 94 | 559 | 5 87 | 34 15 0 | 88 | 530 | 5 50 | 33 2 0 | 6 0 4 |
| | | Private | 2,504 | 10,910 | 22,582 | 4 35 | 9 0 4 | 9,056 | 17,988 | 3 61 | 7 2 11 | 1 15 9 |
| | | | 2,840 | 11,964 | 28,991 | 4 21 | 10 3 4 | 9,914 | 23,318 | 3 49 | 8 3 4 | — |
| 10 | Pullampet | Sircar | 40 | 113 | 857 | 2 82 | 21 6 9 | 109 | 843 | 2 72 | 21 1 2 | 7 11 8 |
| | | Dasabundham | 3 | 7 | 91 | 2 33 | 30 5 4 | 8 | 91 | 2 67 | 30 5 4 | 11 6 0 |
| | | Private | 3,980 | 21,205 | 29,763 | 5 33 | 7 7 8 | 18,747 | 25,013 | 4 71 | 6 4 7 | 1 5 4 |
| | | | 4,023 | 21,325 | 30,711 | 5 30 | 7 10 1 | 18,864 | 25,947 | 4 68 | 6 7 5 | — |

N.B.—The averages for each class of wells in columns 7, 8, 11, and 12 do not, of course, correspond with those entered for the totals of each taluk.

## APPENDIX C.

INFORMATION, gathered directly from RYOTS, regarding the average Out-turn of an Acre of Well Land in Ordinary Years.

| Informant. | Produce of an Acre of Well Land for the Two Crops. | Price of Bullocks, Seed Grain, Labour, Fodder, &c., together with the Assessment to be paid, averaged for One Acre. | Value of the Produce obtained from an Acre of Land in a Year. |
|---|---|---|---|
| Erram Reddi of Tummala, in Kadiri taluq. | Ragi. Cholum.<br>1 putti + ½ putti = 3,168 lbs. | For 4 bullocks, Rs. 160 ÷ 8 = 20<br>Labour - - 10<br>Seed - - - 2<br>Dry assessment - 3<br>Rs. A. P.<br>3) 35 (11-10-8 | Rs. Rs.<br>Ragi 40 + Cholum 25 = Rs. 65. |
| Krishnareddi of Nallamada, in the same taluq. | 7/20 putti + ¼ putti = 1,242 lbs. | For 4 bullocks, Rs. 200 ÷ 8 = 25<br>Labour - - 10<br>Seed - - 2<br>Dry assessment - 3<br>3) 40 (13-5-4 | 12-4-0 + 11-4-0 = Rs. 23-8-0. |
| Taŏudureddi of Tanakallu, in the same taluq. | 1 putti + ¾ putti = 1,848 lbs. | For 4 bullocks, Rs. 200 ÷ 8 = 25<br>Labour - - 6<br>Seed - - - 2<br>Dry assessment - 1½<br>3) 34½ (11-8-0 | 20 + 16-8-0 = Rs. 36-8-0. |
| Hanumanthareddi of Balasamudram, in the same taluq. | 1½ putti + 1 putti = 2,640 lbs. | For 4 bullocks, Rs. 200 ÷ 8 = 25<br>Labour - - 10<br>Seed - - - 2½<br>Dry assessment - 1½<br>3) 39 (13-0-0 | 30 + 20 = Rs. 50. |
| Two ryots at work in irrigating their well lands of Nallaguttapalle, hamlet of Tavalam, in the same taluq. | ½ putti + ½ putti = 792 lbs, with 50 Rs. worth of tobacco for the second crop. | For 4 bullocks, Rs. 166 ÷ 8 = 20¾<br>Labour - - 20<br>Seed - - - 6<br>Dry assessment - ¾<br>3) 47½ (15-13-4 | 10 + 5 + 50 = Rs. 65. |
| Agricultural labourers and the nephew of the Kandlamadugu Reddi, in the Madanapalle taluq. These were engaged in drawing water by "kapelia" from a well for the standing paddy crop of nearly 4 acres under it. | 1½ putti + 1 putti 2,640 lbs. | For 4 bullocks, Rs. 100 ÷ 8 = 12½<br>Labour - - 30<br>Wet assessment - 24<br>Seed - - - 4<br>3) 70½ (23-8-0 | 30 + 20 = Rs. 50. |

REMARKS.—The straw produced is used as fodder, and the dung of the cattle as manure. With 4 bullocks one well can be worked, and under it at least 3 acres can be cultivated; so the cost of labour is divided by 3. Bullocks generally stand 8 years' work, and consequently ⅛th of their value is taken for one year. The "putti" is different in different places, so the equivalent in pounds (*avoirdupois*) has been entered with it. Value of the labour is calculated excluding that which is contributed by the ryot's family. This is taken as 4 persons.

These remarks apply to all the cases entered in the Statement.

The calculation in column 3 is for 3 acres, the average assumed in the Memo. The actual cultivation under these wells was somewhat more, but this figure has been taken to avoid confusion. The other figures of cost of production are actuals given by the ryots themselves.

This information was collected at random whilst the Memorandum was under preparation, in order to show how far I was justified in assuming 1,500 lbs. to be the out-turn of an acre of well land. The calculation given by the Board of Revenue, on page 93 of their answers to the Famine Commission, give only 770 and 666 lbs. as the average out-turn of ragi and cholum respectively in an acre of wet land. It must, however, be remembered that well land produces much heavier crops than land irrigated from a tank, and that it also produces two crops, whereas a large portion of tank land produces only one. It is improbable that the ryots themselves would over-estimate the out-turn; and in assuming the amount to be 1,500 lbs. per acre, I have, I think, left an ample margin for the diminution of water supply to the springs in a time of drought. I may here mention that my experience shows that very few wells ran actually dry during the worst part of the late famine. There was in many a diminished supply; but there can be no doubt that, had they been under proper supervision and in proper repair, the diminution would have been considerably less.

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## MEMORANDUM by Mr. H. S. CUNNINGHAM on WELLS as a PROTECTION against FAMINE.

1. The possibility of protecting tracts of country from famine produced by drought by means of a regular system of wells to be made with the aid of State advances, and to be under some sort of State superintendence, has been the topic of official inquiry and correspondence in the North-Western Provinces.

2. On 26th September 1877, Mr. Carmichael, Commissioner of the Benares Division, addressed the Board of Revenue on this subject in connexion with the Lands Improvement Act. He considered that that measure was inapplicable to the state of things existing in the North-Western Provinces; that there were insuperable obstacles in the way of its successful operation; that practically there was no class of proprietors well enough off to avail themselves of the facilities afforded by the Act to improvement; that, even if there were, the action of any individual would be impeded by that of the brotherhood; anything that was done must accordingly be done by authority; he proposed that Government should construct wells gradually and systematically over non-irrigated tracts; that the landowners should be made to pay 5 per cent. on the outlay, being allowed to re-

coup themselves by levying a water-rate from the tenants who get the water.

3. On November 14th 1877, the North-Western Provinces Government addressed a circular on the subject to all Collectors and Deputy Commissioners. It pointed out that the subject of well-making with Takavi advances had not received sufficient continuous attention; that it had been left to the fancy of individual officers, and to their unsustained and desultory efforts; it referred to Sir R. Temple's experience in Madras, where the spring-harvest was said to be largely owing to wells at a time when tanks and lakes were empty; it noticed the fact that some zemindars were unwilling, as the termination of the settlement period approached, to take advances, for fear of becoming liable to an increased demand, and pointed out that this fear was groundless, and it forwarded a memorandum by the Junior Member of the Board, which contained practical information for the guidance of officers giving and people receiving Takavi advances for well-sinking. The main points shown in this memorandum were that big wells were a far better bargain than small, and that a big well 8 feet diameter, with 8 lifts, the water being 45 feet deep, would cost Rs. 625, and would provide a watering 4 inches deep for 25 acres in 23 days.

The memorandum also mentioned that tehsildars and zemindars often opposed Takavi advances on various grounds, but that such opposition must be overcome in the interests of society.

4. On November 22nd, Mr. Carmichael replied that no improvement would be effected till Government took the matter into its own hands; that "tracts of country "should be selected in one or more districts of a divi-"sion, funds from the Land Improvement Act placed at "the disposal of the Commissioner, and a regular and "thorough system of well-irrigation should be carried "out carefully under his directions." Mr. Carmichael mentioned that in the Court of Wards' estates Government made lessees of villages pay 5 per cent. on outlay incurred for tanks or wells, and he recommended the extension of this system by legislation.

5. On December 21st, the Government of the North-Western Provinces addressed the Board of Revenue. It admitted "that if well-sinking is ever to be attempted "on a scale which will afford adequate protection in "case of drought, it must be undertaken by Govern-"ment;" it desired the Board to select a pergunnah in which it was known that irrigation was deficient, water abundant and not too far from the surface, and that wells could be constructed with a certain prospect of being remunerative. When this had been done, and the details settled, the Government of India was to be addressed for the necessary legislation. It was suggested that the best way of recovering the cost was to add 6½ or 7 per cent. to the revenue; and that the zemindars should be responsible for repairs. The Board was desired to submit, with their report, a Bill carrying out the objects in view.

6. In February 1878, Mr. D. Smeaton, Settlement Officer of Moradabad, submitted a proposal for an experiment to be tried in the Moradabad District. The tract selected was "the Hassanpur pergunnah, with its "adjunct, the Bhúr belt of purgunnah Sambhal." Mr. Smeaton proposed to make one irrigation well for every 200 acres, on the assumption that it would irrigate 50 acres; and thus that ¼th of the area would be protected. Taking the average holding of a ryot at six acres, he reckoned that the ¼th of this would produce 15 maunds or 600 seers, and support a family for six months; the area proposed was 300,000 acres, the wells were to be 12 feet in diameter, to cost Rs. 500 a piece, and as there would have to be 1,500 of them, the cost would be roundly eight lakhs. Government was to reserve to itself the right of distribution, to have the sites free of cost, to realize eight per cent. from the landlord as land-revenue; the landlord should be left to distribute as he chose, and make his terms with his tenants; the landlord to repair, subject to Government supervision, to redeem by paying net cost, and by way of stimulus, to become sole proprietor ten years after building another well of like nature.

7. In March and April a further correspondence took place in which Mr. Wyer, Assistant Collector of Budaon, submitted estimates of two wells, one of 8½ feet diameter to work two buckets, to cost about Rs. 400, and to irrigate two kutcha bigahs per diem, and one for one bucket to cost about Rs. 300. Subsequently Mr. Wyer has informed me that great assistance would be given to zemindars by having in each district a set of boring tools, to cost about Rs. 750, which might be hired out, and thus avoid the risk of sinking a well in an unsuitable spot.

8. I think that we should make this the subject of a specific detailed inquiry,—finding out in the first place from the North-Western Provinces Government whether the Board of Revenue have selected a pergunnah, as desired, and whether they are prepared to go into the matter, conducting experiments if necessary to ascertain the practicability of the scheme.

9. There are, however, a number of points to be cleared up before any one can decide whether the scheme is feasible in itself, and also likely to be financially successful. In fact thus far the inquiry can hardly be said to have got beyond the initial stage. There seem to be four main questions involved. First, the physical practicability of making wells, and the method of selecting sites for them. Second, the cost of construction and the irrigating capacity of the well when built. Third, the fiscal questions, how much is to be paid to Government for it by the zemindars, and under what conditions; and how they are to recoup themselves for such payments. Fourth, the legal question, how to provide for the liabilities thus created.

10. As to the first point, it must be remembered that all the best places have been taken up already: the tracts where there are no wells now are those in which the agriculturists have found it impossible or unremunerative to build them. Is it likely that Government will succeed better than they? What is known as to the conditions which make well-digging more difficult in some places than others? Does any Department, or any officer, possess scientific knowledge as to the geological problem, the character and position of the water-bearing strata, and the strata that overlie them? Can the Public Works Department predict, by the use of an auger, or any simple tools, where a pucka well can be built? It is believed that in the Gangetic valley water can be found anywhere, and the mere putting down a borer and coming on water proves nothing. The water may be a spring, or a trickle from percolation. Moreover the main difficulty of making a well arises from the looseness or firmness of the subsoil: it is necessary to know what the depth is of the sandy stratum which has to be cut through, and whether the sand is firm and dry, or loose and wet like a quicksand. Does the Department Public Works possess tools which will give this information? If so, can they be used by non-professional persons, or only by experienced officers of the Department? And could the Department lend any number of such officers to the Civil Department to select sites for such wells?

11. As to the second point, the papers before me show great discrepancy of opinion as to details. According to Mr. Ricketts, a well 8 feet in diameter can work eight buckets; according to Mr. Smeaton, a well of 12 feet diameter can work four buckets; and, according to Mr. Wyer, one of 8½ feet in diameter can only work two buckets. Mr. Ricketts' 8 feet well with 50 feet cylinder would cost Rs. 620. Mr. Smeaton's 12 feet well, with the spring at 40 feet, which requires nearly 50 feet cylinder, would cost Rs. 650. Mr. Wyer's 8½ feet well, depth not stated, cost Rs. 400. At Mr. Ricketts' well one lift working a bucket holding 3 cubic feet of water, or 18½ gallons, will bring 88 buckets to the surface in an hour, or 792 buckets in a day of nine hours, or 2,376 cubic feet, enough to give a four-inch depth of water to one-sixth of an acre, or at the rate of 14,250 cubic feet of water to an acre. Eight lifts would water 1⅓ acres in a day, and allowing for accidents, sickness, holidays, &c., Mr Ricketts estimates that 25 acres can be watered in 23 days, or say 33 to 35 acres in a month. Mr. C. A. Elliott's experiments (recorded in the North-Western Provinces Revenue Reporter for 1869, page 194) give a very similar result, though the process is different. He found that with a bucket holding on an average 22 gallons, the actual number of buckets lifted in a working day by a pair of bullocks (taking the average of six instances) was 348, and that these irrigated nearly ⅓th of an acre in a day, giving it rather less than 3 inches of water (at the rate of 60,000 gallons, or nearly 10,000 cubic feet to an acre). Wheat requires three waterings, to be given in the months of December—February, so that the total area irrigable by a well is pretty nearly what it can irrigate in a month, or about 35 acres in the case supposed; and, perhaps, five acres more should be added for indigo, sugarcane, and vegetables grown in the other months of the year, making a total of 40 acres.

On this assumption a well with four buckets would irrigate 20 acres. But Mr. Smeaton assumes that his well with only four buckets will water 50 acres "if here

" and there aided by small kutcha walls." Mr. Wyer's well with two buckets will water two kutcha bigahs, or $\frac{1}{8}$rd of an acre, and in 30 days will water 10 acres.

12. It is necessary in the first place to ascertain which of these figures are correct and which not, or whether all are correct for different parts of the country. Of course, the cost of a well will differ in different places, and the area it can irrigate will depend on the nearness of the water to the surface, the quantity of the water, the crop irrigated, and the thirstiness of the soil. It may be that a bucket will irrigate 12½ acres in Moradabad, whereas it irrigates only five acres in Budaun and in the middle and lower Doab; but if this is so, the fact should be ascertained clearly and beyond a doubt. The cost of the well, and the area it will irrigate, are data absolutely necessary to the financial considerations on which the feasibility of its construction rests.

13. Thirdly, the fiscal question. There are two ways of constructing wells, the voluntary and the compulsory. The first method is the one contemplated by the Government North-Western Provinces in their Circular of the 14th November. In order to carry it out the first step would be to make it easy for the zemindar to borrow from Government the necessary sum for constructing a masonry well; he would then bind himself to pay interest on the sum advanced (probably at 7 or 8 per cent. to clear off the capital loan in a given number of years), and he might be left to make his own arrangements with his cultivators as to the taking of water and the rate to be paid for it. Where the zemindar is a single person, or a united family, this would be feasible enough. Where the zemindars are a large proprietory body, and the village much sub-divided among them, it would probably be difficult to carry out such an arrangement.

14. The second letter of the Government, North-Western Provinces, contemplated the compulsory method. Either the well would be built under the direct supervision of Government officials, or the money would be advanced as a compulsory loan to the zemindar to build the well with; he would be compelled to pay 7 or 8 per cent. on it in addition to his land revenue; but in this case, having saddled him with this burden, Government could not, with any appearance of justice, say to him "you shall make your own arrangements for "recouping yourself from the tenants of the lands round "the well;" Government must arrange for a compulsory rate to be paid by those lands. But the North-Western Provinces Government has already, it is understood, pronounced definitively against compulsory rates in the case of canals, and I do not see how the two questions can be treated differently, or what arguments can be used for compulsory rates in the case of wells which do not apply equally to the case of canals. This consideration seems fatal to the proposal made by Mr. Carmichael, and approved by the Government, to give compulsory loans, unless the Government has altogether altered its policy. Supposing this to be so, what would these compulsory rates amount to? Here the relation between the cost of the well and the area irrigated becomes important. In Mr. Wyer' case, where a well costing Rs. 400 irrigates 10 acres, each acre would have to pay about Rs. 3 a year for water-rate, which in the case of many crops and many soils would be prohibitive. In Mr. Ricketts' case, where a well costs Rs. 620 and irrigates 40 acres, the annual interest, say Rs. 45, would not fall much over 1 Re. per acre, and would be quite bearable if the land is dry. But it must be made a compulsory rate. In the case put by Mr. Smeaton, where the land is irrigable by kutcha wells already, it would be very difficult with justice to impose an additional rate, if the fields already pay a wet-rent.

15. Of course, it must be understood that these figures apply only to the interest on the cost of constructing the well. The cost of raising the water is over and above this, and that cost would almost always be greater than the cost of applying canal water. But I am not comparing canal irrigation with well irrigation; the hypothesis with which I start is that the construction of wells by Government would only be contemplated in tracts where no canal runs, nor is likely, as far as we can foresee, ever to run.

16. Fourthly, the legal question. If the loans for the construction of wells are to be compulsory, or the wells are to be constructed at Government expense, the cost thereof being made a lien on the land, it will be necessary to obtain legislative sanction (1) to make the principal cost repayable by the zemindars of the village jointly as a body, or by the particular owners of that part of the village which the well is expected to irrigate; (2) to enable them to recover the interest on that principal by imposing a rate on the cultivators of all the fields which it is estimated can be irrigated from the well. This estimate must, it is presumed, be made once for all beforehand; for if each cultivator were allowed to prove that his field could *not* be irrigated from the well, there would be ceaseless litigation. If the loans are to be voluntary, and all that is needed is to relax and alter the provisions of Act XXVI. of 1871, and the rules made under that Act, then what is necessary would be, I suppose,—

(1) to provide for the making of advances, the principal of which is not to be repaid in a lump, but the annual instalments are to cover principal and interest;
(2) for the redemption of such advances at the landowner's will;
(3) to legalise the action of Government in carrying out works for this purpose and for superintending, repairing, &c.;
(4) to arrange by whom and how the interest is to be paid.

It will, perhaps, also be necessary to provide that rent shall not be enhanced on a tenant, nor revenue on a landowner, for certain periods of time, or under certain conditions, in consequence of his having built a masonry well at his own expense.

17. There are thus certain obvious difficulties in the way of the project; but if it is possible, as is shown in Mr. Ricketts' memorandum, to make a well, which will irrigate more than an acre a day, for about Rs. 625, we seem to have at hand a means of irrigation, which ought not to be left without thorough investigation. Taking the interest at 5 per cent., we have, for a yearly charge Rs. 30 put, according to Mr. Smeaton, 50 acres beyond the risk of famine. Is this charge of less than Re. 1 per acre more than such a protection is worth? If not, to what portions of the country is it applicable? What is the best arrangement for carrying out the employment of State funds upon it? Ought the Government of India to take a project of such general importance in hand, or to leave it to the chance of being worked or overlooked by the Local Administrations? Ought the Revenue, Agriculture, and Commerce Department to deal with it for the whole Empire?

H. S. CUNNINGHAM.

Simla, the 3rd August 1878.

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No. 3503A., dated Camp Lucknow, the 2nd December 1878.

From C. ROBERTSON, Esq., Secretary to Government, North-Western Provinces and Oudh, to SECRETARY to GOVERNMENT of INDIA, Department of Revenue, Agriculture, and Commerce.

SIR,—I am directed to submit, for the information of His Excellency, the Governor-General in Council, a copy of the papers noted below*, on the subject of constructing wells at the expense of the State as a protection from drought, and to communicate the following remarks.

2. The prominent features of the voluminous notes and suggestions, which have been placed before His Honour on the subject, appear to be a very great diversity of opinion as to the amount of pressure which it may be necessary to place upon the agricultural population to induce them to construct wells, much doubtful conjecture as to the method and cost of well construction, and almost complete ignorance both as to the extent to which wells are required and as to the localities in which they are most urgently needed.

3. There are no sufficient data to enable His Honour to place before the Government of India any approximately definite figures, either of the extent to which the public funds would be called upon, under the provisions of any Bill which might now be drawn up, to subscribe

* From Secretary, Board of Revenue, North-Western Provinces, to Secretary to Government, North-Western Provinces and Oudh, No. $\frac{1827N.}{IV.-B.-81}$, dated 6th September 1878, with enclosures and accompaniments.

From ditto to ditto, No. $\frac{1828N.}{IV.-B.-81}$, dated 6th September.

From Under-Secretary to Government, North-Western Provinces and Oudh, in the Public Works Department, No. 1570A.-C., dated 19th October 1878.

to the construction of wells, or of the financial results which would be involved either to Government or to the subordinate landlands of the country, upon whom it is practically proposed to lay the chief burden of risk and expenditure.

4. Under these circumstances His Honour cannot but hesitate to bring forward any final proposition which can be made the foundation of a measure by which the agricultural interests of the whole province must be largely effected, either for good or for evil. Experience has proved the danger of launching into any scheme, however benevolent in intention or plausible in theory, without a careful and practical investigation of the facts by which it is surrounded. It is sufficient to refer to canals—and some such there are—which ought never to have been constructed, and to defray the cost of which the agricultural wealth of the country has been drained, in order to prove the necessity of avoiding such hasty action as may lead to similar results in the general construction of wells. And His Honour fears that any hasty action taken under present circumstances, for the general construction of wells, would but add to the number of well-intended but unprofitable projects. In the famine of 1838-39 it was considered wise to utilise starving labour in many parts of the country for the excavation of tanks. Tanks were dug, but they have been dry ever since.

5. It is one thing to say that a well of a certain kind —costing a certain sum of money, constructed in a certain place, and utilized by a certain set of cultivators on a certain class of soil for the production of certain crops —would or could pay so much rental to the landlord and so much revenue to Government; and another thing to say that such wells can be built at the same cost in many places, and utilized to the same advantage by every class of cultivator under every diversity of condition. It seems to His Honour that not a single well should be built under pressure from Government, until Government is thoroughly assured of the benefits which will result from its construction; and His Honour is completely convinced that no assurance can possibly be furnished until the most careful study has been made of the special circumstances of the locality in which it is to be constructed.

6. The Board of Revenue have in their draft bill proposed to give the Collector of each district authority to construct wells, primarily at the cost of the exchequer, and finally at the cost of the agricultural population, wherever and whenever they may chose to do so. His Honour need make no other reference than to the replies received to the Famine Commission queries to prove the extreme danger of such a proposition. Without entering into a discussion of the causes which have led, and will even under improved administration for some time continue to lead to such a result, the fact is absolutely certain that district officials are practically unacquainted with the agricultural circumstances of the land, and that they certainly have no time now to learn them. A long experience in the review of settlement operations and reports has on the other hand left no stronger impression upon the mind of His Honour than that which induces him to believe that a close and personal inspection of each locality and ascertainment of its condition is the only safe basis upon which to form any proper decision as to its agricultural requirements; and that (more than this) an intimate acquaintance with the requirements of one locality, derived though it be from personal inspection and inquiry, is no safe guide to a knowledge of the needs of another even in the same neighbourhood. Now His Honour cannot conceive any section of agricultural operations which in this country depends upon more numerous or more intricate conditions, both above the ground and under the ground, than that of well irrigation.

The depth at which water will be reached; the depth of water when reached; the abundance of the supply; the condition of strata to be penetrated, or in which water lies; the character of the water itself; the cost and supply of material and labour in each locality; the size of well most adapted to the place; the nature of the soil to be irrigated; the kind of crops which can be raised; the class of cultivators by whom it will be utilized; the relations amicable or otherwise which they bear to each other and to their landlords; the distance which water has to be taken from the well; the extent to which irrigation is already available in the neighbourhood;—every one of these questions (and His Honour cannot pretend to enumerate all that will arise) should in His Honour's opinion be made in each case the subject of special inquiry before sanction ought to be given to the construction of a single well, either at public expense or under official pressure. With this conviction His Honour must record that he is decidedly opposed to the adoption of any legislative measure which will give authority for the construction of wells, except under the most careful provisions for local inquiry by competent and special agency.

7. His Honour is inclined to proceed with even greater caution. In consideration of the large financial interests which must be concerned in any scheme for well construction (how large it is impossible now to predicate), the wisdom of issuing any definite laws or rules under which the scheme shall be worked, until the conditions by which it is surrounded and upon which it is to be framed have been to some extent ascertained, seems very doubtful. In His Honour's opinion the safest course will therefore be to commit the investigation of the circumstances of one or more tracts to a staff of specially selected officers, from whose inquiries more definite ideas may be gained, both as to the financial results which are likely to ensue, and as to the best method of executive procedure; and at the same time to entrust them with authority and funds for the construction of a limited number of wells. His Honour suggests that such preliminary action should be taken at the cost of provincial funds.

8. The views to which His Honour has given expression on the necessity of local investigation by a special staff must, if accepted as the basis of future legislation, lead to the establishment of a separate agency, whose principal duty it will be to study the agricultural circumstances of each locality in which it is proposed to construct wells, or rather whose principal duty it will be to study the agricultural circumstances of every locality not fully irrigated, in order to decide whether or not wells are there required. The question then arises whether the results which will be obtained will justify the expenditure. At present (*i.e.*, until the experimental inquiry which His Honour proposes has been carried out) the amount of expenditure cannot be accurately gauged; but His Honour conceives that local inspection could not be effected at a very much more rapid rate than local inspection for settlement purposes in any set of villages in which wells are required, and in which detailed arrangements have to be made. Taking settlement data as a guide, His Honour doubts if, under a village-to-village inspection, any district could be thoroughly worked by one officer in less than two or three years (some would take more), and His Honour hesitates to estimate the expenditure which would be thus entailed. Roughly, it might be from Rs. 25,000 to Rs. 50,000 per district,—an administrative charge which would in His Honour's opinion have to be borne by the country at large in the capacity of supreme landlord, and not (as one of the items in the construction of wells) by subordinate landlords.

It would be useless to say that the expenditure can be avoided by asking district officials to do the work, even had they the knowledge and aptitude required for the duty, since, under present circumstances, they have no time whatever for local inspections of the kind contemplated.

9. If, then, it is decided that Government is bound, in defending the country against famine, to establish a scheme for the general construction of wells, and the argument is also accepted that no scheme can be adopted which does not involve local inspection by a special staff, it follows that a large expenditure must be incurred over and above the ordinary charges for construction.

10. In considering the important issue thus involved, the question naturally suggests itself whether such expenditure can be simultaneously utilized in any other direction. There is, on the one hand, almost universal ignorance of the agricultural circumstances of the country and its cultivators, and on the other a special staff employed in ascertaining them for the purpose of deciding whether or not they justify the construction of wells. Are there no other questions to the elucidation of which their inquiries can be made to tend? There are, of course, many, and it would perhaps be more difficult to restrict than to extend their number; but what from a financial point of view is more to the purpose, there are some duties now imperfectly performed by district officials, on account of the impossibility of their obtaining that very knowledge of local circumstances necessary to their proper performance, which could be far more perfectly acquitted by special officers studying the conditions of each separate tract. The utilization of their services in such duties would probably enable Government, with little expense to the administration, to draft

some of the existing revenue staff for the special duty of local inspection. Prominent among duties of the nature referred to is that of enhancing and determining tenants' rates, and if (as was once wisely proposed) the rental assessments of each tract were disposed of at one time in each tract for a series of years, the harassing work now thrown upon revenue officials, of deciding rates in every corner of the district in the same season, upon data of which they are in a great measure ignorant, would be swept away, and far more justice would be done to the agricultural population than is now the case. An attempt was made a few years ago to meet the difficulty by appointing from year to year a special officer in each district to undertake rent assessments, but the experiment has failed for obvious reasons, the most obvious being that it is impossible for successive officers to obtain intimate acquaintance with the local conditions surrounding each case in so large an area as a whole district. The above instance has been brought forward by his Honour to prove that expenditure can be defrayed, at least in part, by throwing upon a special staff much work now imperfectly done by the general staff; but it is at the same time clear that many other results can be obtained in directions in which little work at all is now effected, but which are of great importance to the administration, such as the collection of facts relating to the debts and financial position of the cultivating community. It is, however, unnecessary to dwell further at this time upon questions which will, if the experimental trial proposed by his Honour is carried out, be the subject of more mature consideration in any final proposals which may be based upon its results, and it is sufficient to indicate that inquiries necessary for a general scheme for well construction can be profitably utilised in other directions of equal importance.

11. The proposals which his Honour now desires to make are these—

(*a.*) Two tracts, in which there are *primâ facie* reasons for believing that wells can be constructed at a reasonable cost with advantage to the agricultural community, will be chosen in different parts of the province.

(*b.*) They will also be such as contain one or more villages under Government management.

(*c.*) A special officer will be employed in each to make a thorough examination of the country, and to decide for each village in the tract whether or not wells can be advantageously constructed.

(*d.*) If, as inquiry progresses, it is ascertained that wells may be advantageously made by Government agency, a sufficient engineering staff will be placed at his disposal on such terms as the Local Government may consider desirable.

(*e.*) Takávi advances will be granted in all cases where the agricultural communities are willing to accept them.

(*f.*) In other cases, in which the consent of those who possess interest in the land may be obtained, wells will be constructed by Government agency, and a well rate charged on land to be irrigated from them.

(*g.*) In villages under Government management (no consent being required) wells will be constructed by Government agency, and a well rate charged as above.

(*h.*) The object of the experiment being to ascertain the best and most economical plan to be adopted, no precise rules will now be laid down as to the method to be followed in constructing wells.

(*i.*) The Provincial Department of Agriculture will be required to exercise a general superintendence over operations, to consult with the Local Government and with the officers employed as to the different methods which should be tested, and to review from time to time, for the information of Government, the progress which may be made or the difficulties which may arise.

(*j.*) *Pari passu* with other proceedings the officers employed will, so far as they have leisure, be utilized in making special investigations into agricultural circumstances of which at present imperfect knowledge exists (such as those which are now the subject of inquiry by the Famine Commission, *e.g.*, the produce of land, the cost of irrigation, the indebtedness of cultivators, &c.); such investigations will dovetail naturally in with those which are essential for ascertaining the desirability of constructing wells.

(*k.*) At the conclusion of the season a report on obtained results will be required, which may be found sufficient to indicate in what direction legislation is required, as well as the probable financial results of extending the system throughout the provinces. It is, however, likely that since few wells can be constructed in time for the irrigation of this year, a sufficient report cannot be obtained until the end of next cold weather.

12. In carrying out the above programme it does not appear necessary for his Honour to ask the Government of India for assistance, except in the matter of extending the rules under the Takávi Act in such a way as to enable advances to be made on less troublesome terms than those which now exist. A change is so essential that, unless it is effected, his Honour fears that little result will be obtained from the proposed experiments. The changes which his Honour desires to see made, and which, it will be understood, require no fresh legislation, are contained in an appendix to this letter.

13. Pending the consideration of the whole subject of general legislation by the Government of India for enforcing the construction of wells, and of the various issues which are raised in connexion with the subject, it is the intention of his Honour to lose no time in setting on foot the operations explained in the above programme. Meanwhile, his Honour urgently solicits immediate orders on the question of extending the takávi rules, and suggests that if the Government of India are not prepared at present to commit themselves to any general alteration of the rules, special license be granted in the present case for offering advances on more liberal terms.

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No. 1827N. / IV.-B.-31, dated Naini Tal, the 6th September 1878.

From G. Butt, Esq., Officiating Secretary to the Board of Revenue, North-Western Provinces, to Secretary to Government, North-Western Provinces and Oudh.

Present:
H. S. Reid, Esq.,
and
C. P. Carmichael, Esq.

Sir,—I am directed by the Board of Revenue to submit, for the consideration of Government, the draft bill and statement of objects and reasons called for in para. 5 of Government order No. 2975A., of the 21st December 1877.

2. The draft bill is generally approved by both Members of the Board; but on the following points, where the views of the Senior Member are embodied in the draft bill, I am to state the opinions of the Junior Member, and the Senior Member's reasons for the views he holds.

3. Section VIII.—Mr. Carmichael agrees that reduction of rent should be allowed in favour of the tenant, but he would not allow any such reduction of rent to be a valid plea for reduction of revenue, unless the assets of the entire mahál were affected to the extent of more than ten per cent. The area occupied may be of some importance as compared with the area of the tenant's holding, but can seldom, if ever, be but an inconsiderable fraction of the area of the mahál; and, though the zamindars do not directly benefit by any enhancement of the rent paid to them, yet they will benefit largely by the protection afforded to them in the greater security of their rental, while their *sír* cultivation will share equally with that of their tenants in the irrigation.

Mr. Reid considers that the zamindars will have fresh cause for complaint if their tenants' rents are reduced, while no corresponding reductions are made in the revenue payable from such rent, when the person benefited will frequently be the tenant (who is protected from enhancement of rent, and gets all the additional profits from irrigation after payment of the water-rate), and not the landlord.

4. Section XI.—Mr. Carmichael considers that the provision made for both remunerating and indemnifying lambardars is opposed to the principles laid down in a recent ruling of Government (G. O. No. 1101A., of the 29th April 1878), on a reference from the Board respecting the remuneration of lambardars under the Canal Act.

Mr. Reid would observe that his colleague's objection will be met by the introduction of the word "or" at the end of (*a.*) and (*b.*), and addition of (*c.*) "or for both "purposes," of section XI.

5. Section XII.—Mr. Carmichael would allow tenants at fixed rates certainly, and perhaps tenants with right

of occupancy, a right of pre-emption in regard to wells situated in their holdings.

The Senior Member would also be glad to confer this privilege, but he fears that complications might arise. The entire irrigable area would very seldom be in one tenant's holding, and difficulties would arise if the tenant fell into arrears and lost his occupancy rights.

6. Section XIV.—Mr. Carmichael would not allow the purchaser of the well to succeed to the rights of the State as regards levying the water-rate. The purchaser would not in this case, as the bill stands, be able to obtain any return in the form of enhancement of rents. This would act as a deterrent against purchasing. The remuneration in the form of water-rate would only give the purchaser 8 per cent. on his outlay,—a return looked on by natives as a low rate of interest; and from this return would have to be deducted the purchaser's outlay on repairs, so that his actual return would be considerably less. By allowing the purchaser to make his own arrangements for the use of the well, and to arrange for enhancement of rent in return for the use of the water, the purchase might be much more profitable, and there would be more likelihood of the State being relieved from the care of some of the wells, while Mr. Carmichael would not be afraid of the purchaser insisting on too hard terms with the tenant. Common sense would teach him not to do this.

The Senior Member would point out that the rights of the tenants, who, previous to the purchase, had irrigated from the State well, should be respected. They have hitherto paid a water-rate, to the levy of which the rights of the Government, purchased by a third party, have been restricted. As long as they paid that water-rate to Government, so long were they entitled to irrigate from the well. Mr. Reid is not at all sure that it would be wise to encourage the transfer of the well from the State to the proprietor of the land, though it might be permitted. If the new owner of the well were not allowed to levy water-rate, he must be allowed to enhance his tenant's rent. In the case of a tenant at fixed rates, he could not on any pretext whatever levy additional rent. He could levy *nothing* if he were not allowed to levy the water-rate. Not only would there be a deal of litigation, but the well would be likely to fall out of repair, and the objects aimed at by the compulsory system would be lost.

7. In reply to the earlier paragraphs of Government order No. 2975A., it will be sufficient to refer to the collection of printed papers herewith submitted, and to my letter No. 1828N. of this date.

The parganas selected by the Board, for the reasons given in Senior Member's note of 17th April last, are Khairagarh of the Agra district and Hassanpur of Moradabad,—the area to be dealt with in the latter case, including the *bhur* or upland part of Hassanpur, and the continuation of the same sandy ridge in the adjoining pargana of Sambhal in the same district.

The statistics and estimates furnished by the Settlement Officers of the Agra and Moradabad districts will be found at pages 84 to 87 of the printed papers, and supply the details called for by Government.

8. The Board would invite the attention of His Honour the Lieutenant-Governor to Mr. Buck's letter No. 441A., dated 2nd April 1878 (pages 73, 74, and 75, printed correspondence), in which Mr. Buck reports on the experiments with Bull's patent dredger at the Ghâzipur stud farm, and suggests that a contract for 1,000 wells should be given to Mr. Bull in the ensuing cold weather. It appears to the Board that the *bhur* tract of Sambhal-Hassanpur would be the fittest possible field for the experimental working on a large scale of the sand dredger, and they suggest that Mr. Buck, in his capacity of Director of Agriculture, should be empowered to enter into negotiations with Mr. Bull as soon as the Government are authorized to order the construction of State wells on the compulsory system.

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*A Bill to provide for the construction of Wells for irrigation in the North-Western Provinces.*

Preamble. WHEREAS, in order to the more effectual protection from the effects of drought of tracts unirrigated by canals, it is expedient that provision should be made for the systematic construction of wells for irrigation:

It is hereby enacted as follows:—

Short title. I.—This Act may be called "The North-Western "Provinces Well Construction Act."

Extent. It extends to the territories under the administration of the Lieutenant-Governor of the North-Western Provinces, and it shall come into force on the passing thereof.

II.—In this Act "Commissioner" means the chief officer in charge of the revenue administration of a division.

"Collector" means the chief officer in charge of the revenue administration of a district, or any officer authorized by the Local Government to exercise the powers of a Collector under this Act.

"Land" means land used for agricultural purposes, or waste land which is culturable.

"Tenant" means any person using or occupying land, and liable to pay or deliver rent therefor.

"Landlord" means the person responsible for the payment of the Government land-revenue, if any, assessed on a mahál, and includes a muáfidar, nazrannadar, or other person holding land whereof the revenue has, either wholly or in part, been released, compounded for, redeemed, or assigned.

"Rent" means whatever is to be paid, delivered, or rendered by a tenant on account of his holding, use, or occupation of land.

"Board" means the Board of Revenue of the North-Western Provinces.

III.—Whenever it may be proved to the satisfaction of the Local Government that in any tract of country or in any mahál the construction of wells for irrigation is required to protect the area from famine or the effects of drought, and that such wells will not otherwise be constructed, the Local Government may order the construction of wells in such number and of such description as may be deemed necessary.

IV.—Before such order passes, a detailed local inquiry shall be conducted by the Collector, who shall submit, through the Commission and Board, a report setting forth the circumstances of the area to be protected, the number and estimated cost of the wells to be constructed, the area irrigable therefrom, the profits which the irrigation is expected to secure, and the water-rates he proposes to assess on the lands irrigable from the wells.

V.—Whenever the construction of wells in any tract is under consideration, the Collector and all persons authorised by him may enter on any land, and may make and carry on any surveys, levellings, borings, diggings, or other acts or operations necessary to ascertain the fitting sites for the construction of the wells, and may make such other inquiries as may be necessary for the preparation of the preliminary report required by the preceding section.

VI.—Before taking possession of any land, and before the commencement of the construction of any well, the Collector shall cause a notice,—detailing the well or wells to be constructed, the estimated cost of each well, the fields to be irrigated therefrom, and the water-rate that will be charged, so far as the same can then be estimated, —to be served, through the patwári, or otherwise, on the landlord and tenants of the lands to be occupied or to be irrigated in each mahál. Such notice shall call on all parties concerned, who may have any objections to urge, to appear before the Collector at a time and place to be therein mentioned (such time not being earlier than 15 days after the service of the notice), and state their objections.

The objections, if any brought forward, shall be considered by the Collector, and if in respect to any well there appear to be sufficient and valid reasons why the well should not be constructed, the Collector may, subject to the control of the Commissioner and Board, direct that the well shall not be constructed.

VII.—When the construction of any wells in any tract has been ordered by Government under section III. of this Act, the Collector, or any person authorised by him, may exercise the powers conferred by section V., and may also occupy and take possession of any land required for any well, its runs, distribution channels, or other appurtenances, and may also temporarily occupy any land required for operations subsidiary to the construction of the well or wells; but, so far as may be possible, no cultivated land shall be so occupied either permanently or temporarily. Provided also, that no land occupied by buildings shall be acquired except by the consent of the proprietors thereof, or under the provisions of the Land Acquisition Act.

VIII.—No claim to compensation shall lie for any cultivated or culturable land, or for any unculturable area not occupied by buildings, acquired under this Act for the construction of wells; but if the land appropriated permanently be cultivated land in the occupation of a tenant, such tenant shall be entitled to an equitable

reduction from the rent payable by him, and the reduction shall be determined by the Collector whose order shall be final. The landlord shall also be entitled to a corresponding reduction from the land-revenue, if any, payable by him on account of the land so occupied.

IX.—The wells shall be constructed by such agency, in such manner, and under such superintendence as the Local Government may direct.

X.—The lands irrigable from each well, and the rotation in which the water shall be taken, shall be determined by the Collector in concert, as much as possible, with the people, and the arrangements agreed to shall be recorded, at time of settlement, in the village administration paper, and during the currency of the settlement, in a supplement to the village administration paper, by the Collector of the district; and on all lands irrigable a water-rate, the amount of which shall be determined by the Local Government, may be imposed by the general or special order of the Local Government, and the rate may from time to time be altered by the order of the Local Government. The rate shall not ordinarily be fixed at a figure higher than may suffice to secure, in the form of a water-rate, a return calculated at such a percentage on the capital outlay on the construction of each well as the Local Government may determine.

XI.—The water-rate so imposed shall be paid by the person or persons who are in cultivating occupation of the land, and shall be collected either direct from such occupant or occupants, or, if the Collector shall so direct, through the lambardar or lambardars, or person or persons under engagement to pay the land-revenue of the estate. In the latter case the lambardar or person under engagement to pay the land-revenue of the estate shall be responsible for the payment of the amount due for the water-rate leviable from the estate by such dates as the Government shall prescribe, and arrears of water-rate shall be recoverable from such person or persons by the Collector of the district as if such arrears were arrears of land-revenue.

And for the purpose of collection of the water-rate, and recovery of arrears of the same, such person or persons may exercise the powers vested in landlords for the collection of rent and for recovery of arrears of rent.

The Local Government shall provide—

(*a*)—for remunerating persons collecting sums under this section:

(*b*)—for indemnifying them for expenses properly incurred by them in such collections, and for losses incurred in such collection.

XII.—No increase in the productive powers of any land due to the construction of a well, under the provisions of this Act, shall furnish any ground for enhancement of rent under the North-Western Provinces Rent Act, 1873, and such increase shall not be taken into consideration in any such claim. Provided that this section does not apply to lands irrigable from wells constructed under the provisions of section XV. of this Act.

XIII.—The wells shall be kept in repair by the Collector, but the person or persons, in cultivating occupation of the land irrigable from each well, shall be bound to give information through the patwári whenever any well constructed under the provisions of this Act requires repair, and in default of such notice the Collector may realise the cost of the repairs from such person or persons; and in the case of any wilful damage, or of injury due to neglect or want of due care in using the well, the Collector may, after such inquiry as he may think necessary, direct that the cost of the repairs be realised from the person or persons found to be guilty of the wilful damage or of want of due care or neglect.

XIV.—With the previous sanction of the Commissioner, the Collector may permit the proprietor or tenant of the lands which the well irrigates, on payment of the outlay incurred in the construction of any well, and on binding himself to maintain the well in working order, to purchase the rights of the State in any well.

XV.—If in any tract in which the construction of wells under this Act has been determined on, the proprietors of any mahál should apply for permission to construct by their own agency the wells deemed necessary, and to make their own arrangements with their tenants, the Collector may call on such proprietors for a detailed estimate showing the position, description, and cost of each well, and the probable profits derivable from it. On approval of the estimate, and on the proprietors agreeing to pay such percentage on the sums advanced as the Local Government may determine, and binding themselves under penalties to complete the wells within a time to be fixed by the Collector, the Collector, if satisfied that the procedure will tend to economy and efficiency, may, with the sanction of the Commissioner, advance the sums required to the proprietors in such instalments as may be agreed on.

On any default in the conditions, the sums advanced may be recovered as arrears of land-revenue due on the mahál, and the perpetual charge of a percentage on the outlay shall be collected with the first instalment of land-revenue in each year, and can be recovered as an arrear of revenue.

XVI.—The Local Government, with the previous sanction of the Governor-General in Council, shall make rules consistent with this Act in all matters connected with its enforcement, and may, with the same sanction, from time to time alter or add to such rules. Such rules shall make provision for—

The manner in which any preliminary enquiry shall be conducted, and the estimates, statements, and statistics to be then prepared.

The agency by, and the manner in, which the wells are to be constructed, inspected, and repaired.

The manner in which the water-rate is to be calculated, assessed, and collected.

The mode in which the water is to be distributed, or the times for working the well, apportioned amongst the occupiers of the lands to be irrigated from the wells.

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*Statement of Objects and Reasons.*

Experience has proved that no material effect can be expected from any extension of well irrigation, due to advances under the Land Improvement Act; while there are many parts of the North-Western Provinces in which it is believed that practical protection against famine can be ensured by the systematic construction of wells, but where in part from the apathy, want of unity of the people, but mainly from their poverty, the wells, admittedly urgently needed, have not been built and never are likely to be built, unless their construction is taken in hand by Government.

The present bill secures for the Local Government the necessary powers for the construction of wells where needed, and for the recovery of a fair return on the expenditure incurred.

Provision is made for a careful preliminary enquiry before any further action is taken, and the evidence must satisfy the Local Government that the wells are required to protect the area from famine, and that they will not otherwise be constructed.

Opportunity will also be afforded to all persons interested of bringing forward their objections before the construction of any well is put in hand.

The lands to be occupied will be of small area, and generally of little value, and it is considered that in consideration of the great advantages secured to all parties by the extension of irrigation, increase of produce, and stability of rents, compensation or resort to the tedious procedure of the Land Acquisition Act should only be required if it should ever prove necessary to acquire any land occupied by buildings.

It is however provided that when cultivated land is acquired, an equitable reduction in rent and land-revenue shall be made. The capital expended will not be directly repaid to Government, but, as in the case of canals, Government will obtain its direct return in the form of a water-rate, the amount of which can be so determined as to provide a fair return on the expenditure.

The return to be aimed at, and the amount of the water-rate which must vary with the varying cost of well construction in different tracts, is left to the determination of the Local Government, which is empowered, with the previous sanction of the Government of India, to frame rules on these and other necessary points.

The water-rate will be paid by the occupier of the lands irrigable from the well, and collected either direct or through the lambardars as the Local Government may order. If collected through the lambardar, he will be primarily responsible for the entire demand, but in the rules to be framed by the Local Government provision will be made for his remuneration and for indemnifying him for any expenses or losses properly incurred.

It is declared that the construction of a State well

shall furnish no ground for enhancement of rent. The wells will be repaired by the State; but in case of wilful or careless damage, the cost may be recovered from the person found guilty of such injury.

Provisions are made under which the proprietor of the land may be permitted to purchase the interests of the State in wells already constructed, and also for the construction of the wells by the proprietors in cases where they may be willing, and it may be advisable to permit them to undertake the construction of the wells: in this case the funds would still be provided by Government, the zamindars paying a percentage on the outlay, and making their own arrangements for their remuneration.

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No. $\frac{1828N.}{IV.-B.-31}$, dated Naini Tal, the 6th September 1878.

From G. Butt, Esq., Officiating Secretary to the Board of Revenue, North-Western Provinces, to Secretary to Government, North-Western Provinces and Oudh.

Sir,—I am desired by the Board of Revenue to reply to your letter No. 2420A, dated the 14th ultimo, forwarding a copy of a letter No. 147, dated the 8th idem, from the Secretary to the Famine Commission at Simla, together with a copy of a note by the President of the Commission, on well irrigation as a protection against famine, and requesting the Members of the Board to report on the questions raised generally in that note.

MISCELLANEOUS.
REVENUE DEPARTMENT.
Present:
H. S. REID, Esq.,
and
C. P. CARMICHAEL, Esq.

2. After reviewing the correspondence which has passed on the subject of protecting tracts of country from famine, produced by drought, by means of a regular system of wells to be made with the aid of State advances, and to be under some sort of State superintendence (paras. 1 to 7 of the note), the President observes that a number of points must be cleared up before it can be decided whether the scheme is feasible in itself, and is likely to be financially successful. There seem to be (the Honourable Mr. Cunningham writes) "four main questions involved. First, "the physical practicability of making wells, and the "method of selecting sites for them. Second, the cost "of construction and the irrigating capacity of the "wells when built. Third, the fiscal question, how "much is to be paid to Government for it by the "zamindars, and under what conditions, and how they "are to recoup themselves for such payments. Fourth, "the legal question, how to provide for the liabilities "thus created."

3. With regard to the first question, discussed in para. 10 of the President's note, the Board would observe that the absence of masonry wells (it is to them alone that the correspondence which has passed refers), in tracts in which they are needed, is not due generally to physical (or geological) difficulties, or the difficulty of selecting the proper sites. The chief difficulty is entirely one of a financial nature. With reference to the remark that the best places for wells have been taken up already, it seems hardly necessary to assert that, as good places are to be found in tracts which are utterly destitute of well irrigation, as in those in which pucka wells abound. Indeed, where the best places have been taken up already, the probability is that more masonry wells are not needed. Certainly they are not so much needed there as in tracts where the best places have not been taken up. There are of course villages in which wells have been sunk only in those parts in which the soil is fertile, or is of a nature to allow of wells being made at a moderate cost, and well irrigation is thus remunerative. Throughout Bundelkhand districts, for instance, many wells will be found in *parwa* soil, which can be irrigated with profit, and none in poor *rakar*, which is so sterile that the cost of making masonry wells cannot be recovered from the increased profits resulting from irrigation.

It appears to the Board to be incorrect to say that the tracts where there are no wells now are those in which the agriculturists have found it impossible (here the word means physically impossible) or unremunerative to build them. It would be correct to say that there are tracts in which physical difficulties have made it impossible for the agriculturists, with the rude means at their command, to sink wells, or that the wells would be so unremunerative that it is not for the interest of the agriculturists to make them; but in very many tracts destitute of wells, even where urgently required, the absence of wells is due simply to the inability of the landholders, &c. to provide the necessary funds. Masonry wells are made at a considerable cost, which can be recouped from additional profits, only after a long term of years; capital is wanting. The native banker will make advances only at rates of interest which will more than swallow up all additional profits. Government offer money at a lower rate of interest, but Government advances have hitherto been available only after a very tedious procedure; and failure to pay back principal with interest, within the stipulated term, results in the land—for which irrigation is provided—being sold up as if for a default of Government revenue,—a contingency which is sufficient to deter the landholder from availing himself of the Government offer.

4. The extension of well irrigation is mainly a question of money. The question is not whether Government can contend successfully with the physical, but with the financial difficulties which retard the construction of wells. It is possible that Government might overcome the physical difficulties where they exist, but probably in such cases the wells could only be made at a prohibitive cost. When the obstacle is inadequate, additional profits, the substitution of Government for the landholder as the maker of the well, would hardly be fortunate, for, if the latter had the money, he could make the well for much less than the Government officer could. Mr. Ricketts' remarks in the 12th paragraph of his note of the 21st December last are very much to the point: "A zamindar, constructing a well on a "takávi advance, avails himself of all the assistance his "position enables him to obtain, in procuring the wood "for brick-burning from his own trees, the labour from "his own people, the lime is burnt nearly free of cost "from the fuel his own cattle supply; he builds at the "cheapest season, his local well-sinker supplies the supervision at village rates. Certainly a zamindar can build "a well for one-third the money it will cost the Government department. (I speak positively and advisedly "on this point.)"

5. In support of their position that financial and not physical difficulties forbid the construction of wells, the Board quote from a note given to them by an officer of large practical revenue experience. Mr. Sladen writes as follows:—"I dissent from the views expressed in the "first portion of the 10th paragraph of Mr. Cunningham's minute on well irrigation. I believe the main "cause for the non-existence of wells in many tracts to "be simply want of money. In the autumn of 1877, "when I was Collector of Saháranpur, owing to failure "of the rains, I received some 2,000 applications for "takávi advances for the construction of wells, pucka and "kucha, chiefly the former. These wells would, of "course, have been constructed by the people themselves "without any such applications had they the money with "which to do it, and the very fact of their making these "applications shows that the wells could be sunk, and "that the return was likely to be remunerative." Mr. Sladen's arguments are based on facts within his own personal knowledge. What Mr. Sladen here states would seem at first sight to be in favour of a continuance of the voluntary system, but unfortunately experience shows that such applications are only made (often too late) in seasons of extreme distress, when all hopes of the usual rains have failed, and that then the further delays and vexations to which the people are subjected in getting the advances, and which are too well described in Mr. Connell's note, operate still further to create delay.

6. Parganas Sambhal and Hassanpur in the Moradabad district, containing a large proportion of *bhur* (sandy) land, are entirely dependent for their harvests on the annual rainfall. In other words, they form a "tract in which there are no wells now." Much of the *bhur* land is of such inferior quality and so uneven as to be incapable of being irrigated profitably. The irrigable area (including that cultivated and that uncultivated though culturable land) is estimated by the Officiating Settlement Officer at 462,500 acres. Mr. Alexander asks for this tract Rs. 3,60,000, which would provide 600 wells (at Rs. 600 per well). His

estimate is based on the principle of providing irrigation for one-fourth of the irrigable cultivable area, for which 812 wells would be required. But he reduces the number to 600 by making an allowance for irrigable land which might be found inadvisable to irrigate, owing to the depth of the spring-level rendering irrigation so expensive as to preclude all hopes of profit. Here is a tract entirely without irrigation, owing, not to the physical impossibility of constructing wells, or to well irrigation not being remunerative, except in a small portion of the irrigable area, but to the zamindars' want of capital. Pargana Khairagarh in the Agra district (which, with parganas Sambhal and Hassanpur of zila Moradabad, has been selected by the Board for the experimental working of the "State wells' scheme") is of a very different physical character from the Moradabad parganas. In a very large proportion of even its cultivated area there is, the Settlement Officer reports, no probability of water being found, owing to some peculiarity in the stony substrata, and therefore nothing is to be gained by attempting to construct wells. Here we come to a case of physical impossibility in many parts of the tract, in the face of which Government even could not construct wells. In such cases nothing is to be gained by attempting to construct wells, as Mr. Evans puts it, and, therefore, Government would leave such parts of the tract alone.

7. The fact may be assumed that the absence of well irrigation is due mainly to the absence of the wherewithal to make wells, in other words, to the poverty of the proprietors of the land, and often to their apathy, which, except in years of distress, operates against their coming forward for advances, and on the difficulties and delays attending which the Board have already commented. It is in such cases only that the Government would step forward and construct wells themselves under a compulsory system, or advance money to landholders willing to make wells under a voluntary system. Government will not take up tracts where the physical difficulties are so great as to render the construction of wells practically impossible, or unprofitable owing to the cost of construction. There are probably in these provinces millions of acres without irrigation in tracts, which in their physical character are identical with many more millions of acres of land for which the rude genius of the people has provided the means of irrigation in the form of wells. It is with such tracts the Government of these provinces propose to deal. They may be trusted to surmount the difficulties which the native agriculturists have overcome. The Board would invite attention to Mr. Buck's pertinent remarks in paragraph 25 of his note of November 14th, 1877: "If this "principle is admitted, it will be necessary to ascertain "carefully that the construction of wells in certain tracts "is (1) feasible, (2) remunerative. This can be ascertained by special enquiry and by utilising the special "knowledge now available in the settlement staff, who "have been working in the provinces for the last few "years,—knowledge which may in a few years be lost for "ever. I can myself, as a Settlement Officer, point "out tracts in the districts in which I have worked, "where the construction of wells is both feasible and "desirable, and I am sure that other Settlement Officers "can give similar information. I should, however, consider it the wiser course to allow a well-trained Settlement Officer to inspect any tract in which there may "appear *prima facie* reason to construct wells." The Board are of opinion that with the information the settlement returns supply, the local knowledge possessed by Collectors would enable them to select the tracts which most need irrigation, and in which wells can be constructed at a cost which will allow of the cultivator securing additional profits more than sufficient to cover a fair interest on the outlay.

8. The second main question propounded in the note is "the cost of construction and irrigating capacity of the "well when built." On these points Mr. Cunningham observes, "the papers before me show great discre-"pancy of opinion as to details." The Board consider that this could only be expected. Estimates made by officers, whose experience has been acquired in different parts of these provinces, and calculated on roughly ascertained data, must vary if they are made, as they should be, independently of each other. Mr. Cunningham himself points out that the cost of a well will differ in different places, and the area it can irrigate will depend on the nearness of the water, the quantity of the water, the crop irrigated, and the thirstiness of the soil. It is only after ascertaining the distance of the water from the surface, the character of the subsoils, &c., in each individual case, or at any rate in each individual tract, that the cost of a well can be correctly estimated. And there can be but little difficulty in forming on local enquiry a sufficiently correct estimate of the cost, and of the area the well will irrigate, and of the profits which will be secured in ordinary years by the irrigation. Putting aside Mr. Smeaton's estimate of the area irrigable from a 4-bucket well as being too high, and as giving a larger area than by his own showing such a well would irrigate, for he supposes the irrigation from the masonry well to be supplemented here and there by small kucha wells, the estimates of irrigable area range per bucket from 5 to 10 acres. The Board would take 7 acres as a fair average, being rather under than over the mark, and the ordinary cost of a 4-bucket well at Rs. 500. (Its cost may range from Rs. 400 to Rs. 700.) The average difference between wet and dry rent-rates has been assumed by the Board and the Government, North-Western Provinces, Irrigation Department, in calculating the land-revenue due to the canal, at Rs. 2 per acre. A well costing Rs. 500 would secure, in the form of additional rent, a sum equivalent to Rs. (28×2=) Rs. 56, or a little over 11 per cent. on the outlay. Well-making in Khairagarh is much more expensive than usual, owing to the rocky nature of the soil. Mr. Evans, Settlement Officer of Agra, a very safe authority, finds that 2,946 acres may be irrigated by 197 wells, working 491 buckets, and costing on an average Rs. 500. The additional profits from irrigation at Rs. 2 per acre will amount to Rs. 5,892, and the expenditure on the wells to Rs. 98,500. Here the outlay would bring in a return of only nearly 6 per cent. In some tracts the additional profits would represent a return of 15 per cent. or more on the capital expended.

9. Mr. Buck has given in paragraph 17 of his note of the 14th November 1877, a table showing the annual return on capital expended, at rates supplied to him by a professional engineer. The cost of a 4-bucket well ranges from Rs. 488 to Rs. 798, with water at 30 to 60 feet below the surface. Even with water 40 feet below the surface he estimates the return at 12·8 per cent. on the outlay at Rs. 2 per acre. He gives also the returns calculated at Re. 1 and Rs. 1-8-0 per acre. But the Board would note that the difference between the wet and dry rent-rates represents only the returns which the landowner (or landlord) would receive. If the water-rate is paid by the tenant, and the tenant is protected from enhancement of his rent, on the ground that the value of the produce has increased as the Board would propose), the difference between the wet and the dry rent-rate represents only part of the profit which the cultivator taking the water will derive.

10. It appears to the Board that if the Government determine on investing capital in masonry wells, and look to recovering from the profits, secured to the persons who cultivate the lands irrigated from those wells, a sum sufficient to cover the interest of the capital expended plus the cost of maintaining the wells in good repair, all that Government need insist on is that they shall be satisfied that the profits derived from the additional irrigation afforded will be such as to enable the persons receiving those profits to pay that sum year by year. For instance, a Collector applying for a grant for wells in a tract destitute of irrigation, or needing additional irrigation, will satisfy Government that the profits which will be derived from such irrigation will be sufficient to cover such percentage on the capital expended as Government may fix, plus a certain additional percentage for repairs, &c. The Board are assured that it would be only in exceptional cases that well irrigation would not be sufficiently remunerative. In such cases grants must be refused.

11. The President then discusses, in paragraphs 13 to 15 of his note, the third or the fiscal question, *viz.*, how much is to be paid by the zamindar for the well, and under what conditions, and how the zamindars are to recoup themselves for such payments. The first point to be decided is whether Government will adopt, what is styled by Mr. Cunningham, the voluntary or the compulsory system, or what form of either, or work both side by side. Under the existing, which is a voluntary system, that is, under the Land Improvement Act, it is optional with the landholder to apply for an advance for the construction of wells on his property. If he applies, and an advance is made, he is required to repay the amount advanced with interest at 6½ per cent. within a certain term. Under a modification of the voluntary system he might be called on merely to pay a certain percentage on the amount advanced, that sum being sunk by Government in making the wells. Under a voluntary system advances might also be made to such tenants as are legally competent to make wells on the lands they cultivate, and which they hold in occupancy right.



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12. Under the compulsory system the Government might insist on a certain tract needing irrigation being provided with the means of irrigation, and either compel the landholder to take an advance for the purpose, and repay the advance with interest within a certain term (it were chimerical to suppose that such a scheme could be successfully worked), or the Government might construct the wells itself, and demand repayment by the proprietor of the land of both principal and interest within a fixed period of time, or the annual payment only of a certain percentage on the outlay, investing the persons charged with such payment with power to realise the amount from the persons cultivating (or occupying) the land irrigated by means of a compulsory rate. Or the Government might levy such percentage on the outlay incurred in the form of a water-rate payable direct to Government by the person in occupation of the land irrigated.

13. The existing voluntary system has proved a failure for reasons into which it is unnecessary to enter here (they are given in the Board's letter to Government, No. $\frac{597}{IV.-B.-123}$, dated the 9th of June 1875, para. 29, quoted in the 8th para. of the Senior Member's note at page 53); but the Board believe that if landholders taking an advance from the State were not required to repay the principal, but only to pay annually a certain percentage on it, such percentage which would be covered by the additional profits they would derive from the irrigation thus provided, advances would be taken with avidity. The Board consider that this form (so to speak) of the voluntary system might easily be worked, but side by side with that form of the compulsory system they would recommend Government to adopt.

14. The Board consider that the experience of late years shows that the Government must do all in its power to prevent the recurrence of famine, or, at any rate, to mitigate its intensity by all possible precautionary measures. Among the most efficacious of such measures is the extension of irrigation. Many parts of the country cannot be reached by canals, or are not adapted for canal irrigation. In such tracts extension of irrigation can be best effected by the construction of wells. The poverty or apathy of the agricultural population prevent this being done. The Government must therefore be armed with power both to construct wells where they may be needed, and to compel the parties directly benefited to contribute towards the cost. It is on such grounds that the Board advocate the adoption of a system under which the means of irrigation can be provided by the State, when the agricultural population will not or cannot supply them for themselves.

15. Mr. Cunningham observes in the 14th paragraph of his note: "The second letter of the Government, "North-Western Provinces, contemplated the com-"pulsory method." * * * * * "But the North-"Western Provinces Government has already, it is "understood, pronounced definitely against compulsory "rates in the case of canals, and I cannot see how the "two questions can be treated differently, or what "arguments can be used for compulsory rates in the "case of wells which do not apply equally to the case "of canals. This consideration seems fatal to the "proposal made by Mr. Carmichael, and approved by "the Government, to give compulsory loans, unless "the Government has altogether altered its policy." When the provisions of the North-Western Provinces and Canal Drainage Bill were under discussion, the Board, as then constituted (Messrs. Inglis and Reid), went entirely with the Government, North-Western Provinces, in deprecating the imposition of the proposed compulsory rate,—a rate to be paid by all persons whose lands were irrigable, but who did not irrigate from a canal. The Board's objections were based on the following grounds:—The Government canal frequently passes through a tract, parts of which need no irrigation, or to which the passage of a large body of water is positively injurious; that it is unjust to impose a compulsory rate on a zamindar or a cultivator whose land, bordering on or lying within a short distance of the canal, is already irrigated by kucha wells, which may be constructed at a very trifling cost, or already amply provided with means of irrigation from a masonry well made at a very considerable outlay, which was gradually being recouped from the profits of the irrigation provided by it; that it was still more unjust to extort a compulsory rate from a landholder or a cultivator when his land was actually deteriorated by the close vicinity of the canal. The Board pointed out that if the Government demanded payment for *indirect* (and often very doubtful) benefits, such as rise in the spring-level, owing to the canal, and irrigation being thereby rendered more easy and less expensive, they could hardly ignore the propriety of giving compensation *per contra* for *direct* and undeniable injuries, such as the conversion of lands, formerly growing wheat and other crops, into swamps unfit to grow rice in. It will be within the recollection of his Honour, the Lieutenant-Governor, that the construction of the Lower Ganges Canal, for a length of 76 miles, through a country already most lavishly supplied with means of irrigation, was only prevented by the care and foresight of that most admirable officer of the Irrigation Department, Colonel Brownlow, then officiating chief engineer, Irrigation Branch, North-Western Provinces. The 11th paragraph of Colonel Brownlow's note of the 5th December 1876 ran as follows:—"From mile 107 to mile 183, that is, for "76 miles of its course, the Lower Ganges Canal would "pass along the left bank of the Rind Nadi, through "a particularly fertile tract of country, abundantly "furnished with kucha wells, drawing an almost in-"exhaustible supply from strong springs in an under-"lying stratum at about 45 feet from the surface, the "water of which often stands more than 20 feet deep "in well. The settlement returns of 32 villages traversed "by the line of canal in the Etáwah district, show a "total number of these wells amounting to 2,368. There "can be no doubt that canal irrigation would cause "the whole of these to fall in, while there are grave "reasons for fearing that the mere passage of the canal "channel through the tract would destroy the greater "number of them, and render impossible the construc-"tion of new ones. The inhabitants know this very "well, and are bitterly opposed to the passage of the "canal through their country, while our best irrigation "officers unite with those employed in district and "settlement work in deploring the decision to take the "canal through this tract." Had the canal been constructed as originally designed, and the compulsory rate clause been passed by the Legislative Council, the zamindars and ryots of the villages described by Colonel Brownlow would have been compelled to pay for the loss they gained. Moreover, if a compulsory rate were levied where the landholder or tenant failed to irrigate from the canal land irrigable therefrom, he would virtually be fined for not taking water for his *kharif* cultivation, when canal water was not only not required, but its application to the land would be actually injurious if the rainfall were sufficient for the requirements of the soil. Lastly, if the compulsory rate were levied on the ground that canal irrigation afforded insurance against famine, the fact that canal water cannot be regarded as a substitute for, but only a supplement to, the rains of heaven would be ignored, while the burden of insurance would not fall on the public, who would be benefited thereby as well as the cultivator.

16. The Board have explained in full their objections to the proposed compulsory canal rate as the most satisfactory way of satisfying the President of the Famine Commission that those objections do not apply in the case of State wells, which will be made only where they are required, which cannot be injurious to the land irrigable from them, and the construction of which by Government cannot be viewed with apprehension; moreover, the compulsory rate will be only so in name. The water-rate per acre, if it is only fair and moderate, which it must be if it is below the additional profits per acre, would be paid voluntarily and ungrudgingly, as the canal water-rate is wherever canal water is required. The canal water-rates are sufficiently low to induce cultivators to take canal water where they really need it. It is only where, though within reach, it is not wanted that it is not taken. No State wells will be made where water is not required. Under the compulsory system the Board advocate there will be very little need of a compulsory rate. What the Board would propose is that "the Local Government should be em-"powered by law to make wells wherever they consider "that wells are feasible, and will be remunerative, and "means of irrigation, which are wanting, ought to be "provided."

17. Another very powerful argument in favour of any scheme, which will enable Government to provide means of irrigation wherever such means do not exist, or are inadequate, is that such a scheme, which must be a compulsory one, would lighten the burden of, if it did not altogether obviate the necessity for, special taxation to provide funds, either to meet or to defray famine expenditure. The additional food supply which would be derived from the large irrigated area would be greater

than could be provided by the proceeds of any tax which the country would tolerate. The Government might possibly be released from the necessity of attempting to solve a very difficult problem, or, at the worst, the problem would be made the more easy of solution.

18. The "legal" is the fourth main question. The Board are addressing Government separately on the subject of the legislation required to legalize the system which they recommend for adoption. In this place the Board would only explain their views on the subject generally. They consider that the system should be as simple and as little complicated as is possible. No ground for litigation should be afforded. They would not impose on the landholders a burden to be passed on to their tenants. Power should be given to the Local Government (as they have before stated)—(1) to make wells wherever the proper means of irrigation are not, and the Government consider they ought to be, provided; (2) to impose a water-rate per acre similar to the canal occupier's rate on the whole area irrigable from the well, the rate being paid by the cultivating occupant, whether landholder or ryot; (3) to determine the amount of water-rate with reference to the cost of making the well and maintaining it in repair; (4) to fix the remuneration payable to lambardars, on whom the collector of the district should, where he thought it advisable, devolve the duty of collection of the rate; and, lastly, the Board would propose that increased value of the produce, or increased productive power due to irrigation from wells constructed by the State, should form no ground for enhancement of rent.

19. The Board are of opinion that the "State well" scheme can be worked most successfully only if it is placed unreservedly under the Local Government.

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Docket No. 1,570A–C., dated Naini Tal, the 19th October 1878.

From Captain CLAYTON BEAUCHAMP, R.E., Under Secretary to Government, North-Western Provinces and Oudh, Public Works Department, to SECRETARY to GOVERNMENT, North-Western Provinces and Oudh, General Department.

WELLS AS A PROTECTION AGAINST FAMINE.

*His No.* 2,421*A.*, *dated* 14*th August* 1878.

WITH advertence to para. 10 of the memorandum by the President of the Famine Commission, on "wells as a "protection against famine," forwards for information a note on the subject by the Under Secretary to this Government in the Public Works Department, and intimates that the secretary in this department concurs in the views therein expressed.

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NOTE by Captain CLAYTON BEAUCHAMP, R.E., Under-Secretary to Government, North-Western Provinces and Oudh, in the Public Works Department, dated 18th September 1878, on WELLS as a PROTECTION against FAMINE.

Paragraph 10 of the above memorandum raises a series of questions.

The first is, given that the inhabitants of a tract of country have found well-sinking unremunerative, would Government be likely to succeed better. My opinion is that Government certainly would not. The value of well irrigation depends to a larger extent on the spring-level, and if the inhabitants of the tract have been uniformly unsuccessful in reaching water at a fair depth, it is not likely that Government would be more successful, and even assuming that in between the positions selected by the inhabitants there did exist spots where from "faults" in the strata water might be reached at a higher level, the cost of searching through the country for these spots would I consider be a prohibitive one.

This view, however, merely deals with positions in which the inhabitants have been uniformly unsuccessful in the construction of wells. There are many tracts in India over which the rainfall is for nine years out of ten sufficient for all agricultural operations. In these tracts wells for irrigation do not as a rule exist; and if it be accepted as an axiom that it is the duty of Government to protect the people from danger under all circumstances, then the construction of wells over these tracts might be undertaken, indirectly in the interests of Government, and directly in the interests of the people, with every prospect of success.

The next question has reference to conditions that make well-sinking more difficult in some places than in others. The answer is a simple one. The difficulty and (what is more important) the cost depends (I.) on the depth of the water-bearing stratum, and (II.) on the nature of the super-imposed strata.

I do not think any officer in India possesses sufficient knowledge of the geological formation of India to place his finger on a spot where a water-bearing stratum could be found at a convenient level, but local experience (as I have shown above) would enable a very fair conclusion to be arrived at.

The Public Works Department with simple boring apparatus can certainly predict whether a pucka well could be constructed with advantage or otherwise at a spot where the boring took place.

I do not agree with the remark that putting down a borer and coming on water proves nothing. It put down in the dry season it proves a great deal, inasmuch as it shows the presence of water at the time when it is most scarce; and if the experiment be prosecuted still further, and under the water-holding stratum one is reached, through which water cannot percolate (clay, for example), the position is a good one for a well if the depth be not too great.

The Department Public Works does possess boring tools, but certainly could not lend officers from the ordinary establishment to search for well sites; and if officers of the department were specially deputed for the purpose, their pay would have to be met from the funds set aside for the investigations, and I doubt whether the tools could be conveniently used by non-professional officers.

But, as I have observed above, the set of the country, the directions of rivers, the position of the water-shed, and above all the situations in which wells have been already dug, are the best guides for selecting a site for another well.

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APPENDIX to G. O. No. 3503A, dated 2nd December 1878.

In the case of advances given for the construction of masonry wells by the officer specially deputed by the Government of the North-Western Provinces to inquire into the necessity of providing the means of irrigation as a protection from drought, rules 19, 20, 21, 22, and 25 of the rules for giving effect to the Land Improvement Act, (XXVI. of 1871) in the North-Western Provinces and Oudh, are suspended.

II. In the district or part of a district in which such inquiry is being conducted applications for advances for the making of masonry wells may be presented on plain paper, and all instruments executed by persons taking advances for such a purpose, or by their sureties, as security for the repayment of the same, are exempted from stamp duty.

III.—The amount advanced shall be recoverable by equal annual instalments, the first of which shall fall due one year after the completion of the well made with the advance, and the amount of which shall be determined, so that at the expiry of the current settlement of land-revenue the whole of the principal with interest at 4½ per cent. per annum shall have been recovered.

IV.—In lieu of other security the officer authorised to make advances may accept the hypothecation of the enhanced rents payable for the land to be irrigated from the well for which the advance is given, or of a part thereof, or may make such other arrangement as he finds advisable, and is approved by the Local Government, provided he is satisfied that there is reasonable security for the repayment of the advance.

MEMORANDUM by Sir A. CLARKE on the Proposals of the North-Western Provinces Government to construct, at the Expense of the State, Permanent Wells for Irrigation.

A proposal made by the North-Western Provinces Board of Revenue regarding wells to be constructed at the expense of the State, as a preventive against the effects of drought, has led to my attention being drawn thereto by a note in the Secretariat. The general interest attaching to the subject compelled me the more carefully to read the letter No. 3503A of 1878, dated December 2nd, 1878, from North-Western Provinces Government, treating of this proposal, and now induces me to offer the following observations for the consideration of the North-Western Provinces Government.

2. Briefly stated, the Board suggest that certain local rules of the Land Improvement Act, XXVI. of 1871, should be suspended with a view to enable the collector at his discretion to make masonry wells for the purposes of irrigation, where he may consider it advisable to do so; the cost of construction of such wells being recovered from those benefiting thereby, whether their consent to the work has or has not been obtained.

3. The Lieutenant-Governor,—in the face of the great diversity of opinion as to the amount of pressure which it may be necessary to place upon the agricultural population in this matter, the much doubtful conjecture as to the method and cost of well construction, and the almost complete ignorance as to the extent to which these wells are required, and the localities in which they are most urgently needed,—considers it unsafe to allow such latitude to the district officials, who are practically unacquainted with the agricultural circumstances of the land, and certainly now have no time to learn them. Enumerating some of the most prominent points on which correct information will be necessary, it is remarked that they are so multifarious as probably to occupy one officer two or three years at least over each district, at a cost, it might be, of from Rs. 25,000 to Rs. 50,000 per district—an administrative charge which, it is Sir George Couper's opinion, would have to be borne by the country at large in its capacity of supreme landlord. A preliminary inquiry into the subject is suggested by a special staff, which (if I am right in my inference) would consist of officers of the Civil Service probably connected with settlement duties. Inquiries into other subjects, which do not appear to me quite cognate, would also be assigned to this special staff, as well as for experiment, two tracts representing different conditions. Should the inquiries, as they progress, prove satisfactory, it is proposed to place at the disposal of the officers deputed a special engineering staff to prosecute further researches.

4. I agree in much of what is here advanced by the Lieutenant-Governor, but let us first consider what are the subjects of inquiry as detailed in paragraph 6 of the letter. They are :—(1) the depth at which water will be reached; (2) the depth of water when reached; (3) the abundance of supply; (4) the condition of strata to be penetrated, or in which water lies; (5) the character of the water itself; (6) the cost and supply of material and labour in each locality; (7) the size of well most adapted to the place; (8) the nature of the soil to be irrigated; (9) the kind of crops that can be raised; (10) the class of cultivators by whom the wells will be utilized; (11) the relations, amicable or otherwise, which these cultivators bear to each other and to their landlords; (12) the distance which water has to be taken from the well; (13) the extent to which irrigation is already available in the neighbourhood; and every one of these questions should, in Sir George Couper's opinion, be made the subject of special inquiry (and, I presume, favourable report) before sanction can be given to the construction of a single well.

5. Now all the above subjects of inquiry (to which I might also add some, such as the most suitable and economical means of raising the water, the most advantageous site for the wells, &c., which are strictly relevant subjects) all more or less fall strictly within the province of an irrigation officer and occupy his daily thoughts. By no one should the hydrography of the country be more closely studied than by him; and no officer, I presume, is, from the nature of his duties, thrown into closer, if as close, intercourse with the cultivating classes. The question is essentially one of irrigation, and still I must infer from the absence of all allusion to them in the papers before me that not only have the irrigation officers never once been consulted in the matter, but that the necessity of the services of an engineering staff of any kind whatever is not even recognised until the success of the experiments shall have been first assured by the unaided efforts of the special staff selected from what I suppose I shall not err in designating as the revenue branch of the administration.

6. Though an engineer myself, and with considerable experience in other hydraulic works, I do not hesitate to say that the engineering of irrigation in this country presents itself to me as a subject requiring such special training, and such close and long continued study and observation of facts which do not ordinarily come within the scope of other branches of the profession, that it is only with diffidence that, on this subject, I venture to make the following suggestions, throughout which it must be understood that, as regards the irrigation aspect of the question, I hold myself open to correction at the hands of those more experienced North-Western Provinces irrigation officers, whose opinions on this subject, had they been added, would not, I venture to assert, have proved the least valuable contribution to the file, and might perhaps have thrown some light on the statement in paragraph 4 of the North-Western Provinces Government letter, that there are here "some "canals which ought never to have been constructed, "and to defray the cost of which the agricultural "wealth of the country has been drained." I myself know of no such canals, and considering the good service rendered by our canal system during the late famine, I am quite at a loss to account for the allusion. I am assured that the only case remotely justifying such a charge is that of the Ramgunga canal, which, though opposed to the convictions of our most experienced canal officers, was commenced solely as a famine relief work—a labour test in fact—and subsequently abandoned.

7. Having frankly avowed my own dependence on the advice of the officers of the irrigation branch on technical matters pertaining to that branch, it will be held as no disparagement to the officers of the distinguished service, suggested for the special staff of inquiry, if I state my opinion that a committee so constituted will quite fail to meet the requirements of the case.

8. I can but judge from the facts before me, and therefore from an imperfect knowledge of actual facts, but as a case in point in confirmation of the above stated opinion as to the inadvisability of leaving such measures for the decision of inexperts, I would suggest that the Chief Engineer of Irrigation, North-Western Provinces, be asked two questions with reference to specific proposals which I find in the file before me.

9. The North-Western Provinces Board of Revenue wish to commence experiments in two places wide apart, viz., Sambhal and Hassanpur in the Moradabad district and Khairagarh in the Agra district. Taking first the case of Sambhal and Hassanpur in the Moradabad district, I find an officer submitting a proposal to construct 600 wells, at Rs. 600 each, at a cost of Rs. 3,60,000; at the same time stating that 812 wells would really be required to meet the exigencies of the district, which would embrace the irrigation of one-fourth of the whole area or $\left(\frac{162,500}{4}=\right)$ 40,625 acres. I suppose, considering the estimated cost (Rs. 600) of each well, it would not be too much to assume 40 feet as a mean depth. The irrigating duty works out roughly to 50 acres per well. Placing aside for the present the unlimited faith as to the amount of water within reach under the surface of the soil betrayed in this large order for wells over a comparative restricted area of 162,500 acres, this appears to me to be assuming a very high irrigating duty at the best of times, when there is plenty of fodder for the cattle and there is no excessive drought. The risks, at critical times, of the wells running as perfectly dry as the tanks alluded to by Sir George Couper, of cattle being left without fodder,—and consequently of wholesale emigrations, as was witnessed so constantly throughout the last famine,—will all of course receive due consideration with the general question, as with the case of each individual well; but when I see so high a price as Rs. 600 estimated for each well, I naturally expect to see some cause for the great depth to which it is proposed to carry these wells. On inspection however of a map of the country—a country which I must admit I have never seen—I find it to be closely traversed by well-defined drainage-lines, Sambhal itself being not far from a river called the Yar Waffadar or Sote. I would ask, therefore, is it absolutely necessary that the proposed wells should here be sunk in high ground instead

of near the river, where a comparatively shallow well at perhaps one-tenth or one-twentieth the cost would yield a more ample supply of water? In answering this question, it must be remembered (1) that the well is to meet the exigencies of famine, when employment for the population is a desideratum; (2) that the object would be as well met by increasing the food-supply close to the drainage-line or river as a few miles off; and (3) that, in severe drought, probably a greater outturn would result from the perfection of the crops within reach of the drainage-line with none on the water-shed, than from stunted crops over the whole area of drainage and water-shed combined.

10. Next with reference to Khairagarh—again speaking without any local knowledge and merely referring to the map—I find Khairagarh not very far from Agra where a canal runs. I should like to know simply whether there is or is not any chance of any of the Agra Canal distributaries ever being extended so far as to secure this district? If there is such a chance, clearly Khairagarh is scarcely a happy selection for experiment.

11. I have already alluded to the constant failure of even some of the deepest wells during the last drought. This is a very serious consideration as bearing on the State well scheme, but I should much like to have the opinion of the irrigation officers as to whether it would not be better and more reliable as an unfailing source of supply (assuming that wells for irrigation are to be constructed) to place the wells in places well within the influence of the canals, and to deepen the drainage to spring level, in seasons of scarcity forcing irrigation from these sources, and thereby leaving the ordinary canal supply available for more remote and less favored districts.

12. When addressing the Council in March 1878, I stated an opinion that, in face of the evidence as to the general sufficiency of food in the country as a whole, I considered the devotion of funds to railway and other communications in preference to new schemes of irrigation as likely to be not only financially advisable, but to give us a readier weapon against the ravages of famine. This opinion has, I fear, with many led to an impression that my mind is more or less prejudiced against irrigation in favour of railway works. Nothing can be more remote from the facts. I still adhere to the opinion I expressed before Council, and if I now suggest the construction of irrigation wells and the deepening of drainage in canal-watered districts as further sources of supply, I cannot admit that in so doing I am in any way departing from the principles in which I stand committed. What I am now suggesting is no new project, but—a very different matter—the perfection of an already existing system, which from consequently improved drainage is certain to be not only more remunerative, but also vastly improved from a sanitary point of view, which of itself is no slight consideration.

13. But, after all, have we not rather drifted from the main point? The letter from the North-Western Provinces Government is evidently an outcome of the inquiries of the Famine Commissioners, and the constant stress that is being laid on the absolute necessity for a further supply of water rather than of food would almost lead to the belief that it is the former, and not the latter, that is the chief desideratum.

14. In India, water, and more water, seems to be accepted as the panacea for all evils. This is the belief of the cultivator, and even when he sees his fields water-logged, and one member of his family after another being carried off by the sickness due to the excess of this element, he still clings to his belief. And—if I may judge from the voluminous literature on the subject—we too have, to a very great extent, brought ourselves to share in this belief. We cannot but acknowledge that the sickness is often due to excessive saturation of the soil, and we have set ourselves to remedy the defect to a very great extent; but few, if any, of us have really regarded the expenditure on our drainage works as other than a very severe, though necessary, tax on our resources. No matter what other suggestion may be advanced to meet the evil of deficiency of food facing us, it is promptly put out of court as "beyond the "means of the peasant;" but on the other hand, how eagerly is scrutinised the crudest project for the construction of a tank, which possibly will never contain a foot of water owing to deficiency of drainage area as a source of supply, or a porous bottom, which simply permits the water to pass through as soon as it enters. These and other projects, the aim of which is to obtain water, never seem to lack supporters in some direction or other; but blind advocacy for any scheme which promises an accession to the water-supply, and equally blind condemnation of all other projects for the increase of the food-supply as beyond our means, all sight appears to be lost of the real cost of irrigation from canals and wells. We see the green fields on the borders of the Ganges Canal, but how few are aware that the irrigation of every acre there represents the outlay of something very close upon Rs. 35? And what is the cost of irrigation from wells? Not having experience in irrigation myself, I will not attempt to answer the question of my own authority; but it has been gone into very thoroughly by one of our greatest authorities in these matters—the late Colonel Baird Smith—and he lays it down as a fact that the cost of irrigating from wells is no less than 13 times greater than from canals.

15. These facts would represent no mean outlay per acre on one single operation of farming even in England; and when I hear it so constantly urged against improved farming on the English system here that the country is too poor to admit of it, I feel more than inclined to dispute the basis of the argument, opposed as it is to the reasoning of others whose education and experience entitle them to a hearing.

16. There is not, as far as I am aware, in the North Western Provinces a single officer who can claim to have received a thoroughly scientific agricultural education. Strange as it may seem when we consider how principally our revenue is dependent on the agricultural prospects of the country—that oosur, reh and khans grass have, each in their turn, proved to be sources of such disastrous losses to this revenue as to call for report after report and volumes of correspondence—still I believe it to be a fact that in all the voluminous reports on these subjects, the expert, the scientific agriculturist, who alone perhaps is capable of dealing on correct principles with these questions is totally unrepresented!

17. In the course of my travels in Madras and Mysore, I discovered that there are there in the employment of Government no less than three such scientific members in the Agricultural Department. The experimental farm at Sydapett near Madras, to which is attached an Agricultural College for the Natives, is presided over by Mr. Robertson, assisted by Mr. Benson, both of whom were educated at the Royal Agricultural College at Cirencester. At Bangalore a small experimental farm is presided over by Mr. Harman, who took high honors, if he was not the first of his time at the same College.

18. It is no part of my purpose here to advocate, or even criticise, the system of model or experimental farms adopted in the Southern Provinces of India. Nor have I had the pleasure of meeting any of the gentlemen whom I have named; but I have with great interest perused many of Mr. Robertson's reports, and Mr. Harman's experiences at Bangalore have proved facts so utterly at variance with what have hitherto been accepted as agricultural axioms here as to afford us much food for reflection. Subsoil drainage, deep cultivation, and manuring have all been tried there; and the results of each and all these processes point to such extraordinary economy of water, besides increase in quantity, as well as improvement in quality of produce, that we cannot any longer afford to ignore such facts. I cannot quote from memory all the exact figures given, but, as a broad fact, Mr. Robertson states that, as a rule, the rice which has received the least proportion of water is the most nutritious; and, if I am rightly informed, Mr. Harman at Bangalore actually raised the finest crop (I believe of all) without any artificial irrigation at all.

19. No doubt, a great portion of this result was due to the supply of organic matter in the manure; and it has been argued that, as it is the invariable custom of the country to consign this to the flames in the form of fuel, it is needless to attempt to break through the custom as one of the preventives against the results of drought. A more logical reply to my mind would be that the remedy lies in the supply of other fuel—in other words, principally in the extension of our communications to the coal-beds and the cultivation of timber.

20. As regards the cost of deeper cultivation and subsoil drainage, the two recognized great main stays of sound agriculture, those who advance this cost as an objection, and would rather advocate the construction of wells and irrigation from them, should bear in mind that almost the whole cost of subsoil drainage, and the whole of that of deep cultivation, is but a question of labour similar to that which they would divert to raising the water. Moreover, the benefits of the first two are more or less lasting, and, if judiciously executed, cer-

tain; whilst those of the last are confined to the crop, and are anything but reliable.

21. This is not the place to enter into a discussion of the merits or demerits of different operations of farming generally; but. so far as they affect economy in the application of irrigation, I cannot but regard them as strictly legitimate subjects for my consideration. I am only dealing with broad facts, and these, as established by the labours of the three gentlemen I have named, are (1) that an improved system of culture is in this country as much within the reach of an industrious labourer as lifting the water for his irrigation; (2) that each and every improvement in this direction by so much places him beyond the caprices of weather, especially drought; (3) that in some cases they may even be made to supersede the necessity for irrigation.

22. These cannot be considered irrelevant facts; and for this reason I do not hesitate to say that an irrigation officer being the first necessary member of the investigating Committee, the second and no less essential one should be a competent scientific agriculturist; and the less these two are trammelled in their operations of inquiry by the interference of inexperts, the more likely we are to obtain reliable results.

23. It would be for the Committee first to obtain in a general way the data as to cost, feasibility, and financial results, not only of well irrigation, but of any measures tending to the increase of the food supply as applied to districts under varying conditions; and, having obtained them, to apply them to the special cases, on which their advice would be sought by the civil officers, within whose functions would strictly lie the apportioning of the charges of cost. I am well aware of the amount of attention that has been bestowed by irrigation officers on the all-important subject of the irrigating duty of water. The results, however, which have hitherto been obtained by them, invaluable though they are as applied in a general way to a large district coming within the influence of a canal, are not exact enough to meet all their requirements, and are hardly of a sufficiently detailed nature to be applicable to the State-wells advocated for the North-Western Provinces, where each well must be judged on its own merits.

24. The officers working out important agricultural results in Madras would, I think, work to much better advantage if in connexion with some executive branch of the service directly interested in these results, and in a position to give practical effect to them, instead of being isolated, as they are to a great extent, at present. It is true that their reports are published, and, so far, at the disposal of the general public; but the only members of this public who are immediately concerned form in this country an uneducated mass, to whom it is very unlikely that the information will ever penetrate; and. even if it did, they are so ignorant, so wedded to tradition, and so apathetic to all beyond these traditions, that the seed sown often falls on a barren soil. The many and valuable suggestions offered do not sufficiently interest personally any number of the governing body, their drift is but very imperfectly understood, their importance quite lost sight of in the mass of his own particular work which falls to the lot of each Government official; and consequently the feeling is certain, sooner or later, to be generated that all these experimental farming operations represent a useless expenditure of State money that might well be avoided.

25. Now all this would so far be remedied if the scientific agriculturist, whilst engaged in investigations of direct interest to the irrigation officer, were working in conjunction with him, and under the orders of the head of the Irrigation branch. In reading Mr. Robertson's reports, I cannot but be struck with his constant recurrence to the subject of the water wasted in irrigation and its evil effects. The first result of each improved farming operation appears to be economy of water. Subsoil drainage, deep cultivation and manuring, one and all, though tending eventually to increase of food-supply to such an astonishing extent, so strikingly in the first instance affect the "irrigating duty of water"—that object so dear to the heart of every irrigation officer when water is so precious—that it is simply impossible that such a union as I have here advocated should be barren of good results. Even had he the technical knowledge of agriculture to undertake the task, the time of the canal officer is far too fully occupied with other matters to permit of his devoting his attention to a *methodical* series of farming experiments connected with the closely allied subjects of irrigation and drainage. which alone, by placing results before him in a tabulated form, would give him information which would be of any practical value to him. The detailing off of some valuable officer of experience to this special duty of investigation in connection with a competent agriculturist would supply the want, and bring home to the cultivator the importance of the results in a way that I cannot at present see how we could effect otherwise.

26. Though no practical farmer myself, my attention has been drawn to this subject entirely from its important connexion with Indian famines. Famine is so generally connected with drought in this country that my thoughts have naturally been attracted to anything likely to mitigate such a scourge; and in the present state of our finances it seems so hopeless to expect that any funds will be available for new projects for irrigation for some years to come that the time seems most opportune for the consideration of any measures within our means, that hold out promise of increased returns in food-supply and revenue from the supply of water already at our disposal.

27. In the absence of personal experience, it is the more necessary that I should quote the authority for my belief in the virtues of an improved system of agriculture to help us out of our difficulties; the three chief sources of economy in our water-supply, according to this belief, as I have already stated, lying in subsoil drainage, deep cultivation, and the supply of organic matter in manure.

28. With reference to subsoil drainage, I have, unfortunately, before me but one of Mr. Robertson's reports—that of his tour in Coimbatore—published by order of the House of Commons, April 11th, 1878, to which I shall refer frequently hereafter. In this report, no allusion is made to the subject of subsoil drainage; but it has been fully entered into in his previous reports, has been tried at Sydapett, and in proof of its success is now being extended over new portions of that farm; therefore it is evident that Mr. Robertson has faith in its virtues. Amongst these virtues are asserted to be economy of water; but, as I cannot lay my hands on any figures of Mr. Robertson's, in their absence I must refer to a report on the Cawnpore Government farm, to which my attention has been drawn. The report will be found in the *North-Western Provinces Gazette* for August 23rd, 1873. The results are there given according to the plots experimented on, irrespective of area, and not having been given per acre, are very apt to be misleading. Stated per acre of cotton for the Plots I. and II. (which alone from similarity of treatment are at all comparable) the case stands as follows:—

| —— | Cost of Cultivation. | Yield of clean Cotton. | Percentage of clean Cotton. | Profit. | Loss. | Waterings before Rains. | Waterings after Rains ceased on Sept. 22nd. | —— |
|---|---|---|---|---|---|---|---|---|
| PLOT I. | Rs. | lbs. | lbs. | Rs. A. P. | Rs. A. P. | | | |
| Sown June 28th, 1872, before rains | 108 | 344 | 30·78 | — | 40 9 0 | 4 | Three of which the first on Oct. 7th. | Not subsoil drained, but ploughed 7 inches deep with English plough.<br>Received 82 tons good manure.<br>Followed oats and not previously cropped with cotton.<br>Picked from September 24th, 1872, to February 17th, 1873. Attacked partly by ball worm. |
| PLOT II. | | | | | | | | |
| Sown July 13th, after rains commenced | 61 | 446 | 30·71 | 30 8 11 | — | — | One on Dec. 4th. | Subsoil drained, ploughed 7 inches deep with English plough. Received 30 tons of inferior manure. Previously cropped for four or five consecutive years with cotton. |
| Average yield with Native system | — | 80 | | | | | | |

29. It will be seen from this at what a disadvantage Plot II. was placed with reference to Plot I., as regards previous cropping and amount of manure. The sowing of Plot I. before the rains (judging from its out-turn) does not seem to have injured it much, though, perhaps, the attacks of the ball-worm may be attributed to this. It necessitated four waterings before the rains, which may be taken as an offset to its having been sown too soon; but after the rains it required three waterings, the first being called for on October 7th; whereas Plot II. which was subsoil drained only required *one*, and that as late as December 4th, at the same time yielding a return nearly 50 per cent. better than Plot II., and $5\frac{1}{2}$ times greater than the ordinary outturn obtained by the native system of cultivation! It is worthy of remark that Mr. Parsons (who, I presume, conducted the experiments), in his report (*vide* p. 1075 of the *Gazette*) expresses an opinion that possibly subsoil drainage may dispense with the necessity for irrigating rubbee crops altogether. Well might the writer of the report remark that the subject seems worthy of further inquiry; but yet, as far as I know, it was dropped. I venture to think that had this experiment been conducted under an irrigation officer, showing him, as far as could be judged from an isolated experiment, the way to a saving of at least $\frac{3}{4}$rds of his usual waterings, that we should by this time know more of subsoil drainage in India than we do. As far as the experiment extends, it goes to prove that subsoil drainage alone trebles the irrigating duty of water, and, aided by the use of an English plough and manure, gives an increased yield no less than $5\frac{1}{2}$ times greater than the natives with their system hope for. I do not say that it would do so always, because further experiment alone could give us results for other crops and other soils; but supposing the results to hold good throughout, here is pointed out to us not only a means of trebling the irrigating duty of our canal water, and, consequently, of our canal revenue, but also, as due to improved farming combined with irrigation, a return about *seventeen* times greater than we now get. Let it not be supposed for one instant that my hopes are so sanguine as this. I am only quoting the facts as illustrative of my argument that increase of food-suply being the problem before us, it does not by any means resolve itself simply and solely into a question of "more water," as it has been far too much the fashion to consider it.

30. Dealing with a subject on which I am not at home, I can but be guided by facts and figures placed before me in making my comparisons. Let us see what these are. In reading over the papers regarding the Sardah Canal, I find that Mr. D. G. Gilmore, grantee of Goburnat in the Mahomdi District, Oudh, states that he considers irrigation would treble his crops; and Major Forbes, one of our most experienced canal officers, and the designer of the Sardah Canal, who has the credit of being most careful as to his facts, gives us the result of his inquiries that "with reference to the comparison "between the produce of irrigated and unirrigated land, "the results vary between wide limits. In Kheri irri-"gated land is said to yield four times as much as "the dry. Other districts show as due to irrigation an "increase of between 50 and 100 per cent., the average "percentage of all districts being about 70 per cent."

31. I will not undertake to say that, judging from these figures, the increase of produce due to high farming is, compared with that due to irrigation, as $5\frac{1}{2}$ to 4 (the latter figure referring to Kheri), because I have but one isolated experiment at Cawnpore, on which to base an estimate of the former of these figures; but I maintain that a strong *primâ facie* case has been here made out for improved farming as a paying preventive against drought, and that the importance of the result arrived at should not have attracted more attention and led to further experiments, only proves the necessity of carrying out such experiments under the supervision of officers who are likely to turn the results to good account. I cannot myself see my way to attaining this object better than by combining the labours of ascientific agriculturist with those of an experienced irrigation officer.

32. Next as to deep culture. This question is seldom started without the conjuring up of alarming visions of steam engines, steam ploughs, &c., on the one hand, and of the wretched breed of bullocks in this country, on the other. It is not by any means beyond the bounds of possibility, that even in this, as well as in many other operations of farming, the suggestions of a scientific agriculturist might be of great value to the irrigation officer, who has at his command almost unlimited water power distributed over his irrigated area—power at present wasted, but which might some day become a most important source of revenue. In the absence, however of such mechanical aids, there could not be a better illustration of "Where there's a will there's a way" than is to be found in paragraph 119 of Mr. Robertson's report on Coimbatore, where he says:

"In one or two places I saw some very good cultivation, which had been produced by digging the ground over with crowbars; by means of these crowbars the soil had been stirred fully to a depth of 12 inches. This cultivation is performed only on black soils, and during dry weather. Blocks of soil varying in weight from 10 to 20 lbs. are raised and turned over; after a heavy shower of rain these fall to pieces, and a fine tilth is produced. As the clods break down, the roots of grasses, especially of the Hurriallee, which are difficult to remove when the soils are under ordinary tillage, are freely exposed, and can readily be collected. The effects of this crowbar cultivation are supposed to last over 10 to 12 years. The expense of turning over an acre of ground in this way is great. I was informed that it took generally about 80 men one day to dig over an acre of ground, and that each of these men was paid two measures of grain for his work, which would represent a total cost of 160 Madras measures of grain, about Rs. 10. The cultivation is, I think, very perfect, and leaves but little to be desired."

33. Who that saw the terrible waste of labour during the last famine in digging tanks that probably (as Sir George Couper remarks), never hold water, or in constructing unmetalled roads, which, though seldom, if ever used, the first rains will obliterate, as there are no funds for maintaining them;—who that saw all this will deny that the deep cultivation with crowbars of small patches near municipalities would have been a far more profitable occupation? Government, it may be argued, cannot become farmers; but Mr. Robertson shows us how feasible it would have been thus to establish patches of trees, which would have shortly become a fruitful source of revenue and met that great want of the country, fuel—a want to which chiefly is traceable the absence of organic manure on the fields which is the third element of importance, which I shall next consider. Mr. Robertson does not, in this report, give us any exact calculations as to the extent to which water may be economised by increased depth of culture; but, perhaps, it is a safe assumption that it is at least in direct proportion to increase of depth; more likely still in an increasing ratio, if we consider that the moisture stored in the lower depths will be less within the influence of the sun's rays, whilst the greater depth of root must beget increase of the plant above the ground, and therefore increased capacity for absorbing what moisture there may be in the air. In what ratio the crop will be increased by cultivation of greater depth, I will not venture to say.

34. Having already shown how, to a great extent, the evil of a deficiency of organic manure may be met (by improved communications and growing timber, to place fuel within reach of the inhabitants), I must again quote from Mr. Robertson's report to show the value of organic manure as an economiser of water. This he thus gives in para. 68:—

"As a general rule, the soils of the ryot contain but a very small percentage of organic matter, and the tendency is to reduce this percentage still lower. The action of organic matter (*humus*) in the soil is well known; it enables the soil to take up moisture from the air and to store that moisture ready for the use of plants. An application of a quantity of water equal to half an inch of rainfall on a soil containing 5 or 6 per cent. of organic matter will produce better and more continued effects than a quantity of water equal to one inch on a soil containing only 2 or 3 per cent. of organic matter, other conditions being equal. In other words, if the soil were properly manured and tilled, the quantity of water that now suffices only for three acres would suffice for six acres, and the effective work of a well would be doubled. There would be no practical difficulty whatever in increasing largely the organic matter in the soils; it would only be necessary that the farmer should use farmyard manure in manuring his soil instead of burning the dung of his cattle, or that he should plough into the soil one or two green crops The general use of cattle dung as fuel is the curse of Indian agriculture; not only is the soil deprived of so much direct plant food, but the physical conditions of the soil are seriously deteriorated when it is cropped without the aid of organic manure. Mr. Schiffmayer, in his experiments, elsewhere reported, found that the soils of the Sydapett experimental farm had their powers of absorbing and retaining moisture increased 10 per cent. by the addition of 5 per cent. of organic matter."

35. This paragraph leaves nothing for me to add on this head; but having established the power of agri-

cultural science to very greatly increase the irrigating duty of the water-supply already at our disposal, as well as the food-supply, the next question which arises is as to the future field for the utilisation of the economised water.

36. Any traveller by rail through the irrigated districts (say in Aligarh for instance) cannot fail to be struck with the vast plains within easy reach of the canal lying waste and barren. These are the "oosur" plains, and the white patches resembling snow, which abound in many parts, are locally known by the name of "reh." Both have formed the subject of volumes of correspondence and reports, for they represent a most serious loss of revenue to Government. The reh especially so, for it is found to spread in a most alarming way with the extension of irrigation. The result of all the inquiries into this question is, that it is to that water, the abuse of which has created the evil, that we must look for its cure. It will be strange—though it is by no means improbable—should it be found that water, whether as a mechanical or a chemical agent, proves to be the most powerful means of rendering fertile the hitherto barren oosur plains. There can be no denying the fact that it is to the agricultural chemist that we must look for information enabling us to solve these problems satisfactorily, which gives us another reason for his close association with the irrigation officer having command of the water.

37. It is only by such a combination of efforts that I can see my way to a real development of the capacities of our canal systems, rendering these not only highly remunerative works, but also of far more value as sources of food-supply to distant districts oppressed with drought and famine, even than they have hitherto been.

38. I readily accede the probable value of wells in many districts hitherto without artificial irrigation; but before committing ourselves to a vast expenditure of State money on expedients that have been found so frequently to fail in times of greatest need, it is surely necessary that we should have exact data on which to found our hopes. Having obtained such data, it next becomes necessary to determine where wells may be constructed with the best results—in districts remote from or lying within the influence of our canals? Wells are expensive things not only to construct but to work, and are by no means universally applicable. It is, as I have striven to show, quite possible that where these are impracticable, other palliatives, if not absolute remedies, may be within the resources of a science as yet unrepresented, as far as I know, in Upper India. Any inquiries therefore as to the best preventives against drought, and remunerative occupation in time of famine that would be limited to wells or even to irrigation generally, and that would ignore the vast store of useful information bearing on this subject that the scientific agriculturist of our day has at his disposal, would fall far short of the requirements of the case.

39. It may seem to many an almost hopeless task attempting to turn from their long established customs the cultivators of this country, who are perhaps of all men the most strongly conservative; but from what I have already said it will at once be seen of how great importance to us, in a financial point of view, is the subject of which I have been treating. This importance moreover becomes intensified when we find such measures as compulsion in the construction of State wells considered necessary and advocated by officers of such experience as members of the North-Western Provinces Board of Revenue I confess that compulsion, especially in a matter of which we ourselves have yet much to learn, is a word that does not commend itself to me. I would rather lead than drive, and to condemn the former course as impracticable, when we have done so little to test its efficacy, appears to me rather irrational. Much must depend on the manner in which the subject is placed before those whom we wish to influence; and in the absence of intelligent European farmers, with holdings in the country, to lead the way, I cannot conceive any more effective method of bringing home to the mind of the Native agriculturist truths on which his prosperity so largely depends than the carrying out at his own doors, and with appliances within his own reach, the experiments which I am here advocating.

40. I wish to avoid, as much as possible, unnecessary interference with the labours of the experimenters; but it is necessary that I should give some outline of what I conceive should be the character of their experiments, though the experience of the officers concerned may very possibly suggest many useful modifications of my views.

41. First, we wish to compare the results of experiments on wet and dry land. The agriculturist would probably classify his soils into (let us suppose) six heads. I say six, because the following suggest themselves to me as useful classifications:—(1) Clayey; (2) Sandy; (3) Intermediate between (1) and (2); (4) Oosur; (5) Reh; and (6) Black Cotton Soil. This would give us twelve conditions of soil *naturally* differing from each other which would necessitate twelve distinct series of experiments on different "sites," each site being as homogeneous in itself as possible, and comprising an area (say) of six acres, or 72 acres in all, which, as a preliminary to all further operations, should be fenced in and isolated from external drainage.

42. Next as to the artificial sub-divisions of each site—

Let us suppose three depths of cultivation: this would give two acres of ground for each, which might be (say) 3 inch deep, representing the native ploughed land, 7 inch for English ploughed, and 12 inch for the crowbar cultivation alluded to by Mr. Robertson. One-half of each of these plots (or 1 acre of each) should be subsoil drained, and the other left without subsoil drains; and of each acre of the experiment one-half should be manured, and the other half unmanured.

43. The water for irrigation should be rigorously measured out for each half acre (or portions of half acre according to the number of crops being experimented on at one time) from two raised masonry tanks containing 500 cubic feet each, and provided with gauges, one of which tanks might be filling, whilst the other was emptying. Every possible precaution should be taken against loss by percolation between these tanks, and the crops watered; and the subsoil drains from each depth of cultivation should lead to, and their discharges be measured in separate small masonry tanks, one for each depth of cultivation tried. The rain gauge register should be strictly kept, so that the exact quantity of water supplied by rain and from artificial sources for each crop would be registered; that artificially supplied being so according to the discretion of the agricultural officer. The quantity of manure and seed supplied should be weighed, and their constitution noted. The crops, when cut, should be reported on as to quantity of grain, straw, &c.

44. If lime or any inorganic manure should be found necessary, it would most probably be found equally necessary throughout each "site" of six acres; but as much care as possible should be taken that one portion of a site should not be unduly favoured in comparison with another portion of the same site. Should differences within a site be unavoidable, they should be noted, and due weight given thereto when commenting on results.

45. The different processes experimented on and implements used should be such as are within the reach of the cultivators, and a rigid account should be kept of labour and cost of each portion of the experiment.

46. Summarising the foregoing, which may be done in a few words, I may state that I agree with Sir George Couper in his proposal to institute inquiries into matters connected with well irrigation as a preventive against the effects of drought; but I consider that the inquiry should be extended and confined to all cognate subjects tending to economise or provide substitutes for water, or that promise to afford profitable occupation in the fields for the agricultural population in times of famine. After a perusal of what I have here written, I am not without hope that Sir George Couper will also agree with me as to the constitution of the Committee of Inquiry, and think that it should consist of experts from the irrigation branch acting in conjunction with a competent scientific agriculturist; the experiments, of which I have endeavoured to give a rough outline, being conducted under the orders of the irrigation branch.

47. As regards the cost of these experiments, Sir George Cooper estimates them at from Rs. 25,000 to 50,000 per district, and (as being beyond the reach of local resources) thinks it should be borne by the country at large. As to the incidence of the charge I agree, for the results will be of value to the whole country; but considering that irrigation officers will most probably be available from existing staff owing to the present stoppage of all new works; that the results of the experiments must cover a very great portion of their actual cost; and that the agricultural member, the only new officer for the staff, may possibly be obtained from Madras or Mysore to the relief of local funds in those quarters, I should estimate that very satisfactory returns may be anticipated from a total expenditure equal to what Sir George Couper considers necessary for one district.

A. CLARKE.

1st May 1879.

# REPORT of the COMMITTEE appointed under the FAMINE COMMISSION to enquire into the MANAGEMENT OF IRRIGATION WORKS in MADRAS, ORISSA, and MIDNAPUR; together with a SUPPLEMENT on the IRRIGATION SYSTEM of the SOANE CANALS, BEHAR.

## PREFACE.

On the 26th July 1878, the Government of India resolved on the appointment of this Committee, but although one of its members was enabled at the end of August to begin the necessary inquiries, the two others were not nominated nor relieved from their current duties until later, and it was not until the 2nd October that they could hold their first conference. They were directed so to restrict their inquiries as to admit of their Report being before the Famine Commission by the the 1st January 1879 at latest, and the points to which their attention was specially directed were as follows :—

2. (i.)—The best way of administering works of irrigation so as to return a fair profit to Government without making them in any way vexatious or oppressive to the people.

(ii.)—The hindrances or objections to irrigation which might be found to exist, and whether for any reason dry crops are ever grown in preference to wet.

(iii.)—The condition of irrigation in zamindáris, the obligation of the owners to maintain irrigation works, and the expediency of Government interfering to enforce this obligation; also as to whether, where there are Government canals passing through zamindári villages, the ryots receive a fair share of the water and pay a proper sum for the benefits they receive.

(iv.) The best agency for the maintenance of irrigation works, the respective duties of Revenue and Public Works officers, and the extent to which the maintenance may be left to the cultivators themselves.

(v.) Whether in the case of river-fed canals the volume of water in the river is fully utilized at all seasons, and how far the deficiency to meet actual demands is due to defects in the canals themselves.

vi.) How far defects in the construction of works of irrigation have hindered its development: whether vested rights in water have interfered with its utility and led to waste: the history of such rights and how they should be dealt with.

(vii.) The effects of the combination of navigation with irrigation, and how far the benefits secured by the former compensate for the greater cost of the works and the reduced extent of irrigation.

(viii.) Whether in the case of recently opened canals, the irrigation has spread rapidly or not; whether the cultivation has been changed and has required outlay in the adaptation of the fields; and what special measures have been taken, if any, to stimulate the development of irrigation on its first introduction.

(ix.)—Tank irrigation, and the expediency of restoring the ancient system of tank maintenance by the cultivators, the improvement of the supply of tanks by river channels, and the practicability of enabling tanks to hold water for two seasons.

(x.)—The works of the Madras Irrigation and Canal Company, their utility and financial position, the effect of climate, soil, &c. on the extent of their irrigation, and the means recommended for the removal of difficulties found to exist, without dispensing with the agency of the Company.

(xi.)—The present condition and the probable future of the canals of Orissa and Midnapur.

(xii.)—Legislation as connected with irrigation.

(xiii.)—Any other matters alluded to in paragraphs 21 to 31, Chapter IV., of the Famine Commissioner's Circular of 22nd June 1878.

3. These instructions were not to exclude the consideration by the Committee of any matter of importance to which they might think it desirable to direct their attention, and particularly they were asked, should they have time, to report on the value of irrigation and on the feasibility of its extension; but this was to be considered of secondary importance to the points enumerated above, and to be too large a subject to admit of investigation within the prescribed time.

4. The Committee have endeavoured to keep these instructions before them, and although they have not adhered to the order in which they were laid down, they believe they have not overlooked any point in the following chapters :—

CHAPTER I.—General description of the Government irrigation works of Madras.
II.—The state of irrigation in the zamindáris or estates of private landholders.
III.—The principles to be followed in defining the respective duties of officers of the Revenue and Public Works Departments in the administration of irrigation works.
IV.—How far the maintenance of irrigation works should be defrayed by Public Funds, how far it should devolve on those who directly benefit by them, and the possibility of reviving the ancient system of *Khudi Maramat*, or the execution of petty repairs to works by the unpaid labour of the people depending on them.
V.—The direction which should be taken in improving and extending irrigation works in Madras.
VI.—The sufficiency of existing legislation in Madras for the proper administration of its irrigation works, and the treatment of vested rights in water.
VII.—The combination of navigation with irrigation.
VIII.—The state of the affairs of the Madras Irrigation Company, and the best means of improving them.
IX.—The irrigation of Orissa.
X.—Irrigation in Midnapur.

5. After the Committee had dissolved and its President had started for England, the Famine Commission expressed a wish that the other two members of the Committee should report on the system pursued on the Soane Canals. Their report will be found in the Supplement.

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## IRRIGATION REPORT.

### CHAPTER I.

*General description of the Government Irrigation Works in Madras.*

The Government Irrigation Works of Madras vary alike in magnitude, in character and in origin. There are works that yearly irrigate 1,000 square miles; others that do not irrigate 5 acres. Some derive their water from the great perennial rivers of India; others from springs drawn from the sandy beds of rivulets, or from the rainfall of half a square mile ponded up in a valley. Some works date from periods of which we have no historical record; others are the latest outcome of British engineering science.

2. Beginning from the north, there are the two great modern systems of irrigation in the deltas of the Godavari and Kistna. At the apex of each delta a weir or anicut has been thrown across the river holding up the water and enabling it to be diverted into a great system of canals and distributary channels, some of which are adapted for navigation and form the highways of the country. The entire maintenance of the works, and the control and distribution of the water from the time it

enters the canal to where it issues from the village sluice, is generally in the hands of Public Works officers, who are in possession from day to day of exact information as to the state of the supply at all the principal regulating works. Once discharged from the village sluice, the field distribution rests with the peasants themselves. The area irrigated by the Godavari canals amounts to about 540,000 acres, and by the Kistna canals to 265,000 acres, and both systems are being extended.

3. Further south, in Nellore, we have irrigation depending on the anicut built between 1855 and 1860 across the Pennair, a river having a catchment basin about 20,000 square miles, of uncertain supply, and subject to considerable floods. By means of this work water is diverted into two old native channels recently improved and extended, and these supply a great series of tanks. Advantage is taken of every fresh in the river to replenish the tanks, and so the irrigation is carried over the periods when the river itself is dry. The regulation of the water-supply among the several channels of this system and their maintenance is in the hands of Public Works officers. The distribution from the tanks rests with the ryots.

4. Still going south, irrigation is effected in a like manner by a combination of channels and tanks from the Rivers Cortiliar, Pálár, Cheyáir, and Vellár in North and South Arcot and Chingleput. In most cases these existed before the British rule, but the supply of the tanks has been rendered more certain by the erection of weirs across the rivers, and many tanks have been brought into connexion with the rivers which formerly depended solely on local rainfall. The Pálár drains an extensive basin, but its upper waters are so carefully stored in the tank system of Mysore, that in years of ordinary rainfall but little is available for irrigation below. Opportunity is taken of the short-lasting floods to fill the long series of tanks by rapidly discharging channels, and these have been very materially improved by the works undertaken for relief in the recent famine.

5. Still going south, the next river is the Cauvery, which, from the earliest times, has been used for irrigation from its source in the Coorg mountains to its delta in the Tanjore District. It waters probably a greater area than any river in India. In the upper part of its course, as it flows through the Coimbatore, Salem, and Trichinopoly Districts, along with its tributaries, the Bhowani, the Noyel, and the Ambravati, it feeds a whole succession of irrigating channels, while in the Tanjore delta every branch is utilised to irrigate rice lands.

6. The irrigation of the Noyel is effected by a series of tanks in the way already described. The canals of the Bhowani, Ambravati, and Upper Cauvery irrigate directly from their banks, and their supply is maintained either by weirs across the rivers, or by temporary dams made year after year. The strip they irrigate is necessarily long and narrow, for they never rise out of the valleys, but following a serpentine course along the contours, they water every field between them and the rivers from which they are derived. The irrigation thus effected in the Coimbatore District exceeds 40,000 acres, yielding a revenue of about 4 lakhs. The water administration presents some interesting features, and two typical cases may be given.

7. Second in point of size and first in efficiency is the Kalingaroyan channel that is drawn from the Bhowani and flows through the Erode Taluq. It is 60 miles long, waters 9,000 acres in 33 villages, and produces a revenue of a lakh. Of its area, 8,247 acres are double cropped, bearing an assessment, in some cases, as high as Rs. 16-10-8 per acre. The regulation of the supply from the river is managed by the Public Works Department, and an annual grant is made of Rs. 6,000 from Imperial Revenue to maintain the works. The distribution of the water is in the hands of the tahsildar; and in order to maintain the necessary establishment and to effect repairs not covered by the Imperial grant, the villagers pay along with their land assessment a voluntary cess of 3 annas 3½ pies per acre in the upper portion of the canal, and of 4 annas 6½ pies in the lower portion. The cess of 3 annas 3½ pies represents the commutation price of a certain quantity of grain formerly paid. The additional 1 anna 3 pies is the commutation for unpaid labour, which used once to be rendered. In the upper part of the canal the villagers still profess to give this free labour, but practically they do not.

In the 60 miles of canal there are no less than 1,945 irrigating sluices of bad construction and causing great wastage of water. Were these improved, there would be water enough to raise double crops along the whole canal and to supplement the supply of the Pogalur channel below it.

8. The Daraparam channel of the Ambravati is 15 miles long and waters 2,337 acres. The control of the water as well as the maintenance of the works is entirely in the hands of the ryot, and no Revenue or Public Works officer meddles with them. The villagers among themselves contribute a certain quantity of grain according to the area they water, and with this is paid in kind an establishment of nine servants to look after the canal. There is nothing approaching systematic water distribution, and the ryots failing to agree among themselves have expressed a wish that the district officers would arrange a commutation of their grain payment into money, and would take in hand the distribution of the water as they have done on the Kalingaroyan channel.

9 The irrigated area of Tanjore and the revenue derived from it* greatly exceed those of any other district in India, and nowhere is less due to artificial means, or has there been less Government outlay on the construction and maintenance of works.

The Cauvery has many deltaic branches, the water surface in which is generally higher than in the surrounding country. These are kept from overflowing by artificial banks; minor channels have been drawn from them, and the whole country is a net-work of streams. The system is very ancient, and was in full operation when Tanjore became a British province; but its continuance was endangered by the increasing tendency of the Cauvery waters to flow down the Coleroon, which forms the northern boundary of the delta, and to desert the southern channels on which alone the irrigation depended. This was effectually prevented in 1836 by Sir A. Cotton's great work,—the Upper Coleroon Anicut at the head of the delta,—which enables the Engineer to turn the whole supply of the river into the different irrigating streams, but does not enable him to exclude floods. From time to time dams, regulators, and escape weirs have been built throughout the delta, with the object of systematically distributing the water and disposing of floods; but a good deal remains still to be done.

10. In Tanjore, therefore, the numerous branches of the Cauvery take the place of the canals in the northern deltas, and the sluices built across their heads are managed by the Executive Engineers. The regulation of the distributary channels rests generally with the peasant proprietors of the soil, locally termed the *merassidars*. Some of these channels are as much as 20 miles long, and irrigate a number of villages. In such cases there is a well-recognised custom, defined generally in a written document, settling the days and hours during which each village is to take water, and similar rules lay down each man's turn within the village. An establishment paid and appointed by the *merassidars* manages the distribution of water to the fields. Complaints of unfair appropriation of water rarely occur, and are easily settled by the tahsildars. The maintenance and repair of all masonry works and of embankments, and the clearance of channels down to those that water only two or three villages, is effected by the Public Works Department. The villagers themselves clear the smaller channels.

11. In the Madura District some irrigation is effected by channels drawn from the River Vaigai to feed tanks. But the supply of this river is uncertain; the channels are managed by the villagers themselves, and are of a very rude description. To improve this irrigation, it has been proposed to construct a dam across the Periyar River, which rises in the Western Ghâts and flows to the sea westward, and to divert its waters by a tunnel through the ridge into the Vaigai. More will be said of this project in Chapter V.

This district is so covered with tanks that there seems to be more water than land. They are very shallow and much filled with silt.

12. The Támrapúrni in Tinnevelly has a more constant flow than any river in Southern India, excepting the Godavari, the Kistna, and the Cauvery. These four alone draw their supply from tracts under the full influence of the south-west monsoon; but the Támrapúrni is a much smaller river than the other three. Along its course is a valuable strip of irrigation of 65,000 acres, yielding a consolidated revenue to Government of about eight lakhs of rupees. It is carried on by means of tanks supplied by channels, into which the river water

* The area annually paying wet assessment is about 725,000 acres. The consolidated revenue land and water rate about Rs. 36,00,000.

is diverted by eight weirs. Seven of these are of old native construction; the eighth or lowest has been built within the last ten years, and is termed the Srívaikuntham Anicut.

The Executive Engineer controls the supply entering the upper channels and passing the several weirs, but he has no authority to check waste of water within the channels, or to see that it is fairly distributed. The field sluices are very imperfect, and each ryot practically takes as much water as he pleases. The Srívaikuntham Anicut picks up only the water that is unused above, and the available supply in the two canals depending on it falls far short of what was anticipated. The distribution of the water in these two canals is in the hands of the Executive Engineer; and if they are ever to irrigate the area for which they were designed, some saving must be effected in the consumption of water in the upper channels.

13. There remains to notice the rain-fed tanks which exist in vast numbers, large and small, throughout Madras. Most of these are of old native construction, although some few of them have been enlarged by the British Government, and their systematic improvement is being carried on year by year as far as money and establishment are available. The charge of so many small works, however, scattered over the country is a difficult and expensive one for any Government department, and frequent complaints are made on this score. In a future chapter it will be considered how far they may be managed by the ryots themselves. The disposal of the water stored in tanks rests nearly always with the ryots interested. They regulate the sluices, distribute the water, and manage for themselves every detail.

14. In all these systems of irrigation, water is eagerly sought for and highly prized. But there is one unfortunate instance of a large and costly canal having lately been made to supply irrigation to a peasantry who refuse to have it.

The Madras Irrigation Company's canal in Kurnool and Cuddapah will be fully reported on in Chapter VIII.

## Chapter II.

*The state of Irrigation in Zamindáris, and the expediency of Government interfering for its improvement.*

More than one-fifth of the whole Madras Presidency is held on zamindári tenure.* Some of these zamindáris were in existence prior to the British rule; others were created by the Madras Government Regulation XXV. of 1802, which fixed a permanent settlement on these lands. The zamindár is required to pay the annual Government demand and to obey the law within his estate; and provided he complies with these two conditions, the whole policy of Government has been to leave him undisturbed. Regulation XXIX. of 1802 requires the appointment in each zamindári village of an hereditary accountant of *karnam*, and lays down the records of cultivation, revenue, &c., which he is to maintain, and to produce when called on by the Collector. But the same Act goes on to say that Collectors are not to persist in demanding the attendance of these *karnams*, and virtually prevents their obtaining any knowledge of the state of agriculture in zamindáris. The result of this policy has been that, except in the case of estates that have been under the Court of Wards, Government has no definite information of the condition of these extensive tracts.

2. The Committee has been unable to obtain much accurate information as to the state of irrigation works in zamindáris, but the general opinion of those whom they have consulted has been that they were neglected, and where an official is appointed to look after them that he is underpaid and unqualified to deal with water works. On this subject Mr. Martin, Acting Collector of Madura, gives interesting evidence. Writing of the extensive zamindáris of that district he says: "Mostly "they are neglected by the zamindárs and the ryots "utterly." He urges that in Madura it is peculiarly desirable that Government should exercise a control over the water supply, since at present every important stream in the district is commanded by one or other of the zamindárs, so that, if the right to the use of all the water passing through their lands were conceded to them, Government would be powerless to carry out any large measures for the extension of irrigation in the district. In the same strain the late Mr. Boyle, M C.S. wrote (18th September 1873) of the great Ramnad zamindári in Madura. He says: "Not only is the "country in the condition in which men depict India "50 years ago in the utter absence of made roads, but "this event (*sic*) has been intensified ten-fold by the "utter neglect of all irrigation works, tanks, and "channels for years."

3. Where Government canals pass through zamindári lands, as in the Kistna and Godavari deltas, the ryots usually avail themselves of irrigation as they do on Government lands; but instances have occurred where they have been deterred by threats on the part of the zamindár, that he would impose an excessive rate on their wet lands. It is true that by Act VIII. of 1865 the zamindár is only empowered to raise the rents of his ryots with the concurrence of the Collector, but this useful check does not seem always to be observed.

4. In a recent case in North Arcot District, a series of tanks following a natural line of drainage was placed in connexion with the Cheyáir river, by an artificial channel fed by the Aliabad Anicut. Some of the tanks in the series belong to the Arni zamindár. It is impossible to exclude him from the benefit derived by the Government tanks, or exactly to estimate what that benefit is. But he asserts that the work has been done without his consent, and declines to bear any share in the cost, and Government is powerless to compel him to pay, although the district officers allege that he has reaped considerable advantages from the new works. This case is given as an example of what may happen in any district at any time.

5. Since Government has taken on itself the heavy burden of providing food for the nation in a time of famine, and does not refuse to relieve the starving zamindári peasant who comes to the district officer for food, it seems to the committee most important to possess some accurate knowledge of the state of zamindári irrigation works and of their capabilities of improvement. If, moreover, without breach of faith a Legislative Act can be framed empowering Government to insist on the zamindár's keeping his irrigation works in order, and devising the means of making him pay his proper share for the benefits he derives from Government works, they consider that the cause of agriculture would be advanced. But without further legislation nothing can be done, and until systematic inquiry has been made, nothing will be known of State interests which ought not to remain longer in the dark.

## Chapter III.

*The principles to be followed in defining the respective duties of officers of the Revenue and Public Works Departments in the management of irrigation works.*

In the Madras Presidency, as it has been seen, there is great diversity of practice as regards the responsibility of water distribution. In the later works it generally rests with the engineers; in the older, it is divided between the revenue and public works officers on no well defined system.

The committee would lay down the broad principle that where, in the distribution of water, any advantage is to be gained from a professional and technical knowledge of its laws, and where the interests involved are great enough to warrant the expense, it is desirable to entrust this distribution to an engineer.

2. Applying this principle, they find that a vast area of irrigation is effected from tanks watering usually only one village, and from small spring channels. Probably the irrigation from these sources might be considerably extended were the water distributed with rigid economy; but to do so would require an establishment out of all proportion to the good to be effected, while it would entail an interference with village usage which would be most unpopular. Whether or not then the maintenance of these tanks should be effected at the cost of the State, there is no doubt that the water distribution should rest, as at present, with the villagers.

3. Where there is abundance of water in a river to meet the requirements of all the irrigation depending on it, and where, from the natural features of the country, it is impracticable to extend the area of wet cultivation, water distribution becomes a simple matter, and there is little to be gained from employing professional machinery. The ryots may settle for themselves when each shall water his field, or, if it is too large a concern for that, the revenue officers can quite

* Area of Madras Presidency — Square miles. 138,318
Area of zamindáris — 32,895

well decide it for them. The engineer may then best confine himself to keeping the works in repair. Such a case as this is exceptional. More usually it happens that the water is not enough, or that, if it is enough, it requires skilful control to convey it to all the points required, and in all such cases the duty should be committed to the Engineer.

4. It is desirable, however, to fix some limit beyond which State interference should not extend, and the committee would recommend the adoption of the rule laid down by the Madras Government* in 1873, confining the duties of officers of the Public Works Department "to the regulation of the water-supply in channels "which supply the lands of more than one village, and "vesting in the village officers the charge of the water "supplied to single villages from the moment it quits "the regulation sluice, over which, however, they will "have no control."

On after inquiry, it appeared to Government† that in the districts of Tanjore, Trichinopoly, Coimbatore, and Madura, the ryots or village officers do more and the officers of the Public Works Department less than was contemplated in this rule. The circumstances of these districts will be considered in Chapter V.

5. Even in the most recent irrigation systems of Madras, the Public Works officers, who have entire control of the water, have no accurate information supplied to them regularly and at the proper time of the area they irrigate; and when remissions are granted on account of the alleged failure of crops for want of water they are not consulted, except in the Godavari district, as to the accuracy of the statements made. The Committee would urge that, where the control of the water is in the hands of the engineer, the responsibility of the irrigation should be fixed distinctly upon him, and that his opinion should be taken on all matters where a decision must be based on a knowledge of the condition of the water-supply. Upon the public works officer, at least as much as upon the revenue officer, must depend the success of irrigation, and without the hearty co-operation of both that success is impossible.

6. It may not be expedient to have in Madras, as in the rest of India, a distinct Irrigation Branch of the Public Works Department, and the Committee cannot agree as to whether or not it would be advantageous to place some of the larger systems under an Irrigation staff with no other duty to attend to. But it is essential to efficiency to have an adequate number of officers who are able to devote sufficient time to the important duties they have to perform. These duties do not necessarily involve the expenditure of large sums. A small outlay may serve to effect a large increase of revenue, or to ward off an accident which would cause its diminution. The Committee notices that there are frequent changes in the officers in charge of the delta works, and that establishments do not appear to have been maintained regularly at the strength allowed to be necessary. Nor do they consider that, in the re-organisation of the Public Works Department recently ordered, the requirements of irrigation have been sufficiently provided for. They would point out, for example, that the engineer establishment of Tanjore is inadequate to the great interests involved in the management of the delta irrigation.

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## CHAPTER IV.

*How far the Maintenance of Irrigation Works should be defrayed by Public Funds, and how far it should devolve on those who directly benefit by them.*

The consideration of the above question arises from the fact that, in the Madras Presidency, a very large proportion of the irrigation is effected by works individually small and insignificant, but collectively of great importance. These are the tanks to be numbered by thousands and the small channels drawn from the sandy beds of streams. The lands watered by all these works pay an enhanced assessment, and from this it has been argued that the State is bound to keep them in repair.

2. The repairs are executed through the agency of the Public Works Department, which, however, has not the means of dealing effectively with the vast number of small tanks existing in some districts. Much of the work to be done demands no professional supervision, and if the duty could be transferred to the ryots, a substantial advantage would have been gained; at the same time it has been proved by the state of the tanks left entirely in the ryots' hands, that without pressure of some kind they will not keep them in repair, and that self-interest is an insufficient inducement to do so. The Committee, after much consideration, have arrived at the conclusion that the following proposals afford the best prospect of a satisfactory solution of the difficulty.

3. They have no reason to suppose that the tanks in the Presidency, taken as a whole, are in a worse condition than they were 30 years ago, and, indeed, it is certain that large numbers of them have, within the last few years, been placed by the Department of Public Works in a thoroughly satisfactory state; but larger sums are now spent on them than formerly, and the question occurs how they were then maintained with less expenditure. There is no doubt as to the reply. During the first half of this century the ryots were admittedly under the obligation to watch over the safety of their tanks, and to carry out the petty repairs necessary from month to month. They received no pay for their labour, nor was any deduction made from the land assessment on account of it. It was the ancient and recognised rule of the land and was locally termed *Khudimaramat*. For much of the ordinary tank maintenance then the State paid nothing, but funds were occasionally given by Government and disbursed through the agency of the Revenue officers in the nature of a grant-in-aid for some specific repair, such as the closing of a breach, the renewal of a waste weir, or the improvement of a tank. For the villagers were not expected to give their unpaid labour to effect improvements, but only to maintain works *in statu quo*, or to keep them from falling into disrepair.

4. A Public Works Commission in 1854 pronounced against this system as open to many abuses, and in 1856–57 the Department of Public Works was established. The duty of initiating tank repairs was then removed from the Revenue officers and transferred to the new department; but it was not empowered to insist, as the Revenue Department could, on the ryots performing their *Khudimaramat*. The range Engineer carried with him none of the influence of the Deputy Collector or Tahsildar. He was left to get on as best he might unaided, and thus an amount of unpaid labour, representing probably some lakhs of rupees, was lost to the State. The ryots soon found that no more was expected of them. Why should they stop holes or cut down prickly pear when Government was going to do all that for them? And although, from the exigencies of the Budget and the want of supervising establishment, they must have since found out that minor works were receiving but little attention, still, since the Public Works Department has been in the habit of taking up every here and there a group of tanks and spending money on it, the ryots have refrained from exerting themselves in the hope that it will some day come to their turn too.

5. Where irrigation is effected by small spring channels, almost the only repair needed is their silt clearance, and as this absolutely necessary at short intervals to get water at all, it is still generally performed by the free labour of the ryot. The case of tanks is different. Their irrigation will go on until the final moment when the embankment bursts, and there is not the same pressing need for the ryot to exert himself in repairing them. We have to consider then the best system of tank maintenance.

6. In the opinion of the Committee, the first measure to be taken is to revive the custom of *Khudimaramat*, and to place it on a satisfactory basis,—that is, to require from the peasantry of the country the execution from time to time of those petty repairs to irrigation works which are necessary for their safety and good order. This is no new proposal in Madras. Section VI. of Act I. of 1858 empowered the enforcement of this obligation, but it was worded in such an indefinite way that it has seldom, if ever, been used. This was prominently brought to notice in the report of the Public Works Commission of 1869–70. In paragraph 10 it is said,—

"There is, therefore, a very general agreement as to the necessity for providing more definite powers for the enforcement of the obligation than are conferred by Act I. of 1858, section 6, and after hearing much evidence on the subject, and giving it, as its importance demanded, very full and careful consideration, we beg to make the following recommendations:—

"In the first place, we consider it to be both necessary

* Proceedings of the Madras Government, No. 713, Department Public Works, dated 5th March 1873.

† G. O. No. 307, dated 18th November 1874.

and desirable in every way, that careful local inquiry should be made in and throughout each district as to the work of this kind, which is or has been customary.

"Secondly, that customary labour, so ascertained, should be enforced by a legal enactment. A draft Act has been prepared and discussed, and will be found appended to this report."

7. The careful inquiry here referred to was, under instructions from Government, very completely carried out, and the Board of Revenue * came to the conclusion that the expediency of maintaining the system of *Khudimaramat* where it was already in force, and of reviving it where it had fallen into desuetude, had been satisfactorily established.

8. It seems to the Committee needless to take further evidence to prove the expediency of re-establishing this old custom. They have considered an alternative proposal to raise an irrigation cess for the maintenance of minor irrigation works; but they believe it would certainly not be more popular among the people while it could not really meet the difficulty. An irrigation cess would place more money in the hands of the Public Works Department, but the expensive machinery for supervising its disbursement would remain as at present. Labour requiring only village supervision is wanted rather than money, and labour is precisely what the ryot can most easily give. In Appendix A. of this report will be found a draft Act, which the Committee beg to recommend for adoption. It has been based closely on that proposed by the Public Works Commission of 1869 70, modified by the result of the after-inquiries alluded to, and by the views expressed on them by the Board of Revenue.

9. Assuming that the custom of *Khudimaramat* is re-established, the Committee recommend that the irrigation works of the Presidency be divided into two classes, imperial and minor. It is not easy to lay down exact rules applicable to all districts defining into which class each work should fall, so they will describe generally what is intended to be the distinction, and Collectors, in communication with Superintending Engineers, might be required to submit a list for each district, and where they place a work in one class, which, from the following definition, should be in the other, they should explain their reasons.

10. Imperial works then are such as from their magnitude, financial value, relative position, or other like cause, have an importance beyond that of a few villages. All canals or channels on which there is navigation, or which irrigate more than three villages, or in which the regulation of the water-supply and distribution is in the hands of Public Works officers, and all tanks irrigating above 200 acres, should be classed as Imperial works. So should smaller works which have special importance from their position such as tanks situated just above a line of railway or a town, which would suffer seriously from their breaching. All works not so specified should be considered minor works.

11. Imperial works should remain, as at present, under the direct supervision of the Public Works Department; but on these, as on minor works, the delta canals and channels excepted, petty repairs should be executed by *Khudimaramat*. Minor works should ultimately be removed altogether from the Public Works Department, who should thereafter be required to execute repairs only to their masonry works, unless from any special cause, such as a cyclone, Government should see fit to afford assistance, and the work to be done may require professional supervision.

12. The Committee would divide minor tanks into three classes, and here again the limits about to be laid down are not intended to be adhered to rigidly and may vary in different districts:—

(*a.*) Tanks irrigating above 50 acres, but not classed as Imperial works;

(*b.*) Tanks irrigating less than 50 acres, and which it is desirable to keep in repair.

(*c.*) Tanks irrigating generally less than 10 acres, the maintenance of which is of no importance to the State, and possibly of little consequence to the village concerned.

13. As regards tanks irrigating above 50 acres, it is desirable to have a standard laid down defining the proper height and section of the embankment. Executive Engineers should be required, in communication with Collectors, to submit lists showing those already brought up to standard and those remaining to be done. The former should be at once removed from the Public Works registers and made over to the village officers to be kept up to the standard through the agency of *Khudimaramat*. The latter should be maintained through the same agency *in statu quo* until such time as they may be brought up to the required standard from the yearly grant of the Department of Public Works, and then they also should be removed from its registers.

14. As regards tanks irrigating less than 50 acres, it is not generally necessary to lay down any standard. All that is wanted is that they should be kept in working order, and this should be done by *Khudimaramat*. They should all therefore be made over forthwith to the village officers, and the Department of Public Works should have no further concern with them except as regards masonry repairs.

15. It can be no greater hardship on the ryots now than formerly to carry out *Khudimaramat*. But the Chief Engineer for Irrigation is of opinion that something beyond this must be required of them if the tanks are to be maintained in efficient repair, as, for instance, the occasional closing of a breach, the restoration of the inner slope of unrevetted *bunds*, the planting of grass to check wash, turfing, the complete clearance of prickly pear, &c. If this opinion be accepted, the Committee recommend that if, on yearly inspection, these matters be found to have been properly attended to, the Collector should be empowered to make some reduction on the wet assessment of lands under minor tanks. To carry out this system the Chief Engineer also considers that special legislation is necessary, but on this grave question the other members of the Committee are not in a position to give an opinion.

16. The system of *Khudimaramat* to be successful at all must be carried out thoroughly, and the Committee do not consider the present district establishments sufficient for the inspections required, for the state of a tank is not to be discovered at a glance. In many taluks the tahsildars would not have time to inspect all their tanks yearly, and the Committee learn on all sides that little is to be hoped for from the revenue inspectors. They recommend therefore the appointment of tank inspectors in each district, whose duty it should be to inspect and report to the Collector regularly once a year on every minor tank in their charge, besides making special reports when required on the state of any particular tank. These inspectors should be directly under the Collectors, and their salaries should not be less than Rs. 150 per mensem. It must be found experimentally how many tanks should constitute the beat of one inspector. Under the most favourable circumstances, the Committee do not think it should exceed 1,000. The post will be an important one, for on the inspector's recommendation will depend very much whether or not the villagers get the reduction on their assessment proposed in the last paragraph.

17. District Revenue officers will of course consider it their duty to keep a watchful eye on the work of the inspector. In every village must be kept a tank book, in which should be entered, in the case of tanks watering more than 50 acres, the particulars of the standard to be maintained; and in every case the date of the inspector's visits and the state in which he found the works should be entered by him and signed. The tank book should be prepared on a regular printed form and kept by the *Kurnam* as one of his village records.

18. There remains to be considered what is to be done with the small tanks (class *c* of paragraph 12) which are of such little consequence that no harm would arise from their ceasing to be maintained. In some districts it is believed that there are many of these small tanks. The Department of Public Works has never had time or money to attend to more than a few of them. The banks are in bad repair, they hold only a few weeks' supply of water, and although the lands they water are assessed as wet, remissions are so frequent that Government derive little more from them than the revenue of dry lands. Where therefore it can be done without financial loss to Government, it is recommended that the land under the tank should be offered to the ryots at the permanently improved dry rate on the understanding that they may maintain the tank or not just as they please, but that under no circumstances will the revenue be remitted on account of its breaching. Where the irrigated area is held by one person, he might be offered the bed of the tank as well as the lands he holds under it at one uniform dry rate, allowing him to grow wet or dry

* Proceedings of the Board of Revenue, Madras, No. 1192, dated 6th May 1876.

crops, and to maintain the tank or not as he pleases. Where the irrigated area is held by several persons, and they elect to allow the tank to fall out of repair, the bed might be made over in the usual way to applicants for it. Before determining on any such course as this (which was suggested by Mr. R. K. Puckle, C.S., in 1866 for the district of Tinnevelly) the financial results must be calculated, and collectors might be called on to find what has been the average rate per acre actually paid to Government for the lands under these small tanks taken over a series of years and the money spent on their repairs, and what would be the result of assessing them at a dry rate in the manner proposed. If the change can be made without serious loss in revenue, an advantage would be gained in diminishing the number of tanks to be maintained by the revenue officers.

19. The committee have been unable to obtain information as to the number of tanks of the several classes in all districts of Madras, and they fear that the figures given in the accompanying statement are not altogether reliable, especially as regards the smaller tanks. They are useful, however, in showing the numbers to be dealt with. They would call attention to the great number of small tanks in Madura, a district in which perhaps more than any other they require consideration.

*Statement of the Number of Irrigating Tanks in some of the Districts of the Madras Presidency.*

| District. | Tanks irrigating an Area. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Less than 10 Acres. | 10 to 20 Acres. | 20 to 30 Acres. | 30 to 40 Acres. | 40 to 50 Acres. | 50 to 100 Acres. | 100 to 150 Acres. | 150 to 200 Acres. | 200 to 500 Acres. | 500 to 1,000 Acres. | Over 1,000 Acres. | Total. |
| Bellary | 146 | 85 | 60 | 55 | 40 | 178 | 153 | | 94 | 25 | 14 | 850 |
| Kurnool | — | 50 | 33 | 39 | 19 | 70 | 62 | | 32 | 2 | 2 | 309 |
| Kistna | — | 384 | | | | 201 | | | 52 | 15 | 5 | 657 |
| Nellore | 14 | 68 | 62 | 43 | 41 | 142 | 139 | | 131 | 59 | 57 | 756 |
| Salem | 509 | 302 | 170 | 118 | 75 | 165 | 110 | | 58 | 3 | — | 1,510 |
| North Arcot | 981 | 506 | 344 | 240 | 193 | 533 | 373 | | 106 | 17 | 4 | 3,297 |
| South Arcot | 161 | 1,809 | | | | 1,112 | | 163 | 213 | 33 | 4 | 3,495 |
| Coimbatore | 28 | 20 | 17 | 11 | 8 | 31 | 26 | | 28 | 10 | 2 | 181 |
| Madura | 5,518 | 2,073 | 1,116 | 574 | 626 | 1,457 | 916 | | 536 | 127 | 48 | 13,291 |
| Tinnevelly | 410 | 1,125 | | | | 625 | | | 124 | 26 | 12 | 2,322 |

20. North Arcot may be taken to show the effect of the foregoing proposals. Out of 3,297 tanks only 127 would be classed as imperial, and 3,170 as minor works. Of the latter, 981 would be liable to be left to the ryots to maintain or abandon as they might deem fit, contingent on Government not suffering distinct financial loss from the transference from wet to dry rates of the area now irrigated by them. The ryots would be required to maintain 1,283 tanks in good working order and 906 in addition according to a fixed standard to which the Public Works Department would gradually bring them, their wet assessment being reduced on this account. All these, 2,189 tanks (1,283 + 906) would be under charge of the district revenue officers, and to aid them two or perhaps three tank inspectors would be required.

## Chapter V.

*The Direction which should be taken in improving and extending Irrigation Works in Madras.*

The opinion seems not uncommon among those who have little knowledge of the subject, that irrigation may be extended in India till the whole country is one vast sheet of cultivation independent of drought. No sooner does famine threaten the land, than the press contains letters reflecting strongly on the apathy of Government regarding the extension of irrigation; and to prove that the cause of humanity will be rewarded by a financial harvest, its success in the deltas is confidently quoted. The unreliability of forecasts founded on such premises will hereafter be instanced in Chapter VIII. In this chapter it is proposed to indicate the direction which should be taken in the advancement of irrigation.

2. In the systems of the Godavari and Kistna deltas, a good deal still remains to be done, and large estimates for the latter are before the Goverment of India. The proposed works are extensions of branches to take in new irrigation, adjustment of slopes, and addition of locks and weirs to improve navigation and to diminish the yearly charges for silt clearance, and works of provision for cross drainage, by which serious mischief is done year after year. In the opinion of the Committee, it is highly desirable that these irrigation works, which are so pronounced a success, should be completed.

3. It may safely be said that no untried field of irrigation is left in Southern India which is likely to yield anything approaching the financial success of the deltaic works. Athough the volume of the rivers is still far from being all expended, it is so intermittent that without storage only a small proportion can be utilised. The two expedients are—

(*a.*) to store the upper waters in great reservoirs during the season of floods, and thus to feed the diminished supply during the hot months;

(*b.*) to take advantage of the short freshes that may be expected at any time, and by a system of rapidly discharging channels, to replenish the tanks in the vicinity.

The difference between the two systems is obvious, and while the latter as already stated *) has been successfully practised in several districts, no reservoir has yet been made with a view of keeping a constant supply in a river.

4. At first it may appear that sites for such reservoirs could easily be found in the valleys of the Western Ghats and elsewhere, but this is not the case. If the slopes of the valley be too steep, a high embankment will hold up but a small volume of water; if they be too gentle, the embankments will often be inconveniently long, and the area submerged will bear a large proportion to the area to be irrigated. The configuration of the valley may be all that can be desired, but the area draining into it may be out of proportion to the size of the reservoir, or their may be no building materials available; or no suitable site for an escape weir which forms so essential a part of the construction; or what is not uncommon, the climate may be so deadly as to reduce the period for carrying on work to but a few months in the year.

5. The only river basin which has been systematically explored in search of reservoir sites is that of the Tungabhadra, the principal affluent of the Kistna. It rises in a country where, *primâ facie*, there was as good probability as anywhere in Madras of finding what was

* Chapter I, paragraphs 3 and 4.

required. But few favourable sites were found, and still fewer that were likely to prove a financial success. This river skirts the Bellary District, where the rainfall is always scanty and where the recent famine raged with terrible severity. If any large extent of land in Bellary is to be rendered secure from famine, it must be by irrigation from the Tungabhadra, and more water cannot be drawn from that river for more than four or five months in the year, unless reservoirs are formed. The country to be traversed by a canal in Bellary is difficult, and no highly remunerative project is possible, even if the people would readily take water, which cannot be asserted. But this much has been learned, that, with an outlay of about 1½ millions sterling, a canal could be constructed to irrigate 150,000 acres, yielding rice enough to support a million of people for six months. This canal also would supply the city and cantonment of Bellary which often suffers from drought. In the light then of an insurance against famine, the Committee consider that it would be expedient to depute an experienced revenue officer to report whether the water would be quickly utilised, and on the assessment which ought to be charged. With this information Government could decide whether it would be right to carry out the project.

6. A good many individual projects for reservoirs have been completely or partially investigated, and some are only awaiting a favourable opportunity for execution. Amongst those on a large scale may be mentioned the two following:—

(*a.*) The Kistnagiri reservoir for the purpose of storing the upper waters of the Ponnár in the Salem district. It has been proposed to form here a reservoir with a water-spread of from 24 to 30 square miles, capable of irrigating from 96,000 to 120,000 acres. The scheme appears to be feasible, and the amount necessary to be paid for the lands submerged is now under consideration.

(*b.*) The Periyár project to supplement the supply of the Vaigai in Madura. This would be a magnificent engineering work, involving great difficulties of construction. The Periyár has its origin in the hills in Travancore, and flows westward into the Indian Ocean. It is proposed to throw across its valley a dam 168 feet in height, to pierce by a tunnel the hills dividing the water-shed between it and the Vaigai, which flows eastward, and through this tunnel to carry a canal of 1,600 cubic feet per second, capable of irrigating an area differently estimated at from 96,000 to 150,000 acres. The estimated cost of this work is 60 lakhs, and if it really costs no more, there is little doubt of its financial success. But many risks must attend its construction. So high a dam has not been hitherto built in India. The site is in a valley covered with dense jungle, rainy, feverish, and uninhabited. The project has been dropped for the present, but in the opinion of the Committee it should not be lost sight of.

7. Another important project is that termed the Rushikulya in Ganjam, which has been fully elaborated with a view of drawing water from that river and from the Mahánadi, of supplementing their supplies by two large reservoirs, and of irrigating thereby an area of 120,000 acres. Ganjam is a backward district, where prices and consequently land assessment are abnormally low, so that it would be impossible to charge at present water rates for this irrigation high enough to pay over 4 per cent. On this ground, the scheme has been laid on one side. It appears to the Committee, however, that it is worth considering whether, by progressive rates, an adequate return could be secured within say 15 or 20 years. The project has been deemed of high value to the tract of country which would be brought within its influence.

8. It is recommended that, whenever the circumstances of the water-supply of a river or basin are not thoroughly known, an examination should be made comprehensive enough to enable Government to determine on the expediency of utilising its waters for irrigation. To do this, the natural features of the country, its geological formation, its rainfall, and many other points must be investigated. Such an inquiry cannot be made during the spare hours of the officers of the ordinary Public Works establishment, and it would be necessary to appoint a special staff to examine systematically the several sources of water-supply. It might occupy several years, and it might result in the fact being established that in very few cases could projects be devised of financial success. But the Committee would point to the invaluable famine relief works with which the Bombay Presidency were furnished at the outbreak of the recent famine, irrigation projects carefully prepared beforehand, but condemned as financially unsound, until the necessity arose for relieving the working classes. In return for the relief afforded, the country has been enriched by a series of works which afford the best insurance against future famines. The Madras Presidency could not do better than follow this example.

9. In Chapter I. has been generally described what has been done in some cases in the connexion of tanks with rivers. In this direction much still remains to do, and it is advised that projects with this object should be systematically prepared. These projects will deal more with the minor rivers than with those on which depends the irrigation of the deltas. Generally they will be found to represent few engineering difficulties, and individually not to cost very large sums. Among those that have been thoroughly investigated, the committee would call special attention to the Sangam project in the Nellore District.

10. In 1870 this project was framed. It was to cost Rs. 25,83,800 and to yield a revenue of 7·88 per cent. The following year it was submitted to the Government of India for sanction from loan funds, and from that date until now it has been the subject of discussion and of correspondence between the Supreme and Local Government. The former required the inclusion of several items omitted or understated in the original estimate, such as increased cost of establishment, rateable provision for leave and pension of those employed, and interest charges while the work was under construction; and each of these points was the subject of separate reference, until in 1876 the estimate had amounted to Rs. 43,79,304,* on which the revenue would only yield an interest of 4·28 per cent.

11. The Sangam project includes a weir across the Pennair River, and the formation of a channel from its northern flank to carry 7,000 cubic feet per second, and to utilise the flood waters of the river in replenishing a number of tanks. The Committee cannot doubt that this is a thoroughly sound scheme, and one likely to yield a sufficient return on the outlay. It is not for them to give an opinion how far the requirements of finance made it necessary to load the original estimate with indirect items, increasing it by 58 per cent., but they would note that, while in 1874 the Government of India recorded that Nellore "may be considered to be "already protected from severe famine,"† the experience of the last two years tells a different tale, and they think it unfortunate that the Sangam project was not carried out when first proposed.

12. In whatever way it may be determined to provide in future for the maintenance of tanks, their improvement must be steadily pursued. What they generally most require is the means of disposing of surplus water, and the result is that in years of by no means excessive rainfall they breach in large numbers to the great loss of the agricultural community and of the Government revenue. The latter amounts to from 70 to 80 lakhs per annum. Money has been given with more freedom in recent years than formerly, and many tanks have been improved; but the Irrigation Department calculate that, in order to make all the more important ones safe in seasons of ample rainfall, there is still required a

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* Estimate as submitted by Madras Government, 18th March, 1871:—

| | Rs. |
|---|---|
| For works | 24,8 ,625 |
| For establishment | 2,75,000 |
| Total | 27,56,625 |
| *Deduct* | |
| Value of land in bed of tanks | 1,72,825 |
| Total | 25,83,800 |

Estimate according to G. O. G. G., dated 12th November 1875:—

| | Rs. |
|---|---|
| For works | 25,40,845 |
| Establishment (25 per cent.) | 6,35,211 |
| *Indirect charges*— | |
| Capitalisation, land assessment | 5,28,080 |
| Leave and pensions | 1,52,113 |
| Accumulated interest on capital | 6,52,754 |
| Total | 45,08,923 |
| *Deduct*— | |
| Value of land in bed of tanks | 1,29,619 |
| Total cost | 43,79,304 |

† G. O. G. G. No. 207 C. W. I., 27th November 1874.

period of 20 years, and an annual grant three times as great as that hitherto appropriated for this purpose.

13. It must not be supposed that, because the tanks as well as most of the minor rivers of Madras failed utterly in the recent severe famine, they are not of very great value to the country. They afford an effective protection against the far more common partial droughts which, though limited in extent and duration, occasion much suffering and loss, and fatally check all progress and improvement. Even in the last famine these minor works were of value. Lands connected with them ceased to produce grain-food later and recommenced to produce earlier than others dependent only on rainfall, and so by the help of these works the period of suffering was shortened.

14. The Committee do not think that much should be expected from a proposal that has found favour to some extent to construct reservoirs capable of storing water for two years. Supposing that sites could be found for reservoirs capable of holding a two years' supply, and that they could be constructed for a moderate cost, which is most doubtful, still with the same sum a far larger number of tanks might be constructed or improved for one year's supply, and in ordinary years these would be just as useful; while in the two years' reservoir the loss by absorption and evaporation would be so great that the water retained for the second year would not do one-fourth as effective duty as if expended in the first. It seems better then, with a limited budget, to spend money in storing much water for immediate use than to provide a little to meet a possible future contingency.

15. Many improvements remain to be effected on existing canals. The boundaries of the Government property in the canals and their banks are generally very badly defined, and at some places the ryots have been in the habit of encroaching on the banks and levelling them down into their fields till what remains is too narrow for safety, when the water is higher than the country. The result is the occurrence of breaches. The Committee consider the subject deserving of attention. For systematic irrigation, water should be thoroughly under control, and any causes which may check its steady supply during seasons of demand should be removed. The engineer should be able to warrant its unbroken flow, and to divert it to whatever part of the irrigated area most requires it. For this purpose proper works of regulation are necessary; head sluices that are not liable to be silted up, that can be opened with ease to take in what is required, and closed with equal ease to keep out floods; regulating works at the heads of the different branches within the canal; escape works to carry off to streams, where they can do no harm, surplus floods brought in by side drainage; and, not least important, well-contrived and yet inexpensive outlet sluices to discharge the water into the ryots' field channels. From want of these outlet sluices much waste occurs, and banks are endangered by the clumsy troughs and pipes used in their place. It is best to exclude drainage from a canal altogether, but this can only be done at great cost when canals run across the drainage of the country, as is very often unavoidable in Southern India. The drainage must be met by the canal from one side or the other. It is cheapest to let the water in, and to pass it out again by an escape weir or sluice; but the drainage brings with it a quantity of sand, perhaps of brushwood and grass, and these are apt to be deposited in the bed and seriously to check the flow of the water. If possible, then, it should be passed under the canal by an aqueduct, or by an inverted syphon; or if it is not meant for navigation, the canal may be passed by a syphon under the drainage, or when the drainage is very large the discharge of ordinary rainfall may be passed under or over the canal, and the excess, when the rainfall is unusually heavy, may be passed through it. Works of the above nature are much required on the irrigating channels of Coimbatore.

16. It has been said (Chapter I.) that floods cannot be excluded from the irrigating branches of the Tanjore delta, and this occasions a yearly outlay in maintaining miles of river embankment to a height which would be unnecessary if there were no such floods. Within the delta the first great branch from the main Cauvery River is the Vennár, on which depends an irrigation of 393,000 out of 822,000 acres. The volume at the bifurcation should therefore be nearly equally divided. But although there are dams at the head of the Vennár across both it and the Cauvery, they are not capable of easy regulation, and it is difficult to keep the Vennár fully supplied, even at times when there is enough of water for both. In 1870, a complete project was submitted for effecting a thorough control over the heads of these two branches, and for restricting the flood water to be admitted by discharging into the Coleroon all above a certain quantity by an old native work termed the "grand anicut." These works were estimated to cost Rs. 5,20,620; and large annual savings in maintenance charges and more certain irrigation to the taluks were anticipated from the improvements; but doubt was expressed by the Government of India as to whether the Coleroon could carry the flood water that would thus be thrown into it, as there would be an addition of about 17 per cent. to the volume it now carries in maximum floods. To solve this question, information was called for which has never yet been supplied. With these improvements, and the addition of about fourteen minor regulators, and the substitution of a number of really efficient irrigating sluices for old ones, the irrigation works of the Tanjore delta would be in a fairly satisfactory condition, and in the opinion of the Committee it is highly desirable that these improvements should be made. The wet revenue of the district is about 36 lakhs.

17. In Chapter III., the opinion of the Commtitee was stated as to the relative duties of officers of the Revenue and Public Works Departments in irrigation matters, and it was mentioned that in the four districts of Tanjore, Trichinopoly, Coimbatore, and Madura the control of the Engineer did not go as far as was contemplated by Government. The Committee are not prepared to recommend any great changes in these districts. The system in Tanjore has gone on so long unchanged and is so popular with the people that no benefits are likely to be gained commensurate with the evil of uprooting a good institution. In Trichinopoly, the irrigation does not warrant the expense of employing a Public Works officer on it. In Coimbatore there would rarely be a demand for water beyond what can be supplied by the present arrangements, if the improvements mentioned in paragraph 15 were carried out. Irrigation in Madura is in a very unsatisfactory state, but no good will arise there from mere administration, and some steps ought to be taken for utilising systematically the rainfall on its hill ranges.

18. In the Godavari and Kistna deltas, when a ryot wishes to take up fresh irrigation, he applies to the tahsildar, who grants the permission without consulting the Executive Engineer as to whether it is convenient to supply more water to this particular place. As long as there is abundance of water to spare, no great harm arises; but cases may be easily supposed when the ryot would get his permission to irrigate, although the Executive Engineer would be unable to give him his water; and it is recommended that for the future the tahsildar should grant leave to no ryot until he has produced a certificate from the Executive Engineer that the water is available.

19. In all cases where the control of the water is in the hands of the Executive Engineer, Collectors should not grant remissions of revenue on the ground of alleged short supply of water without hearing what the Executive Engineer has to say. In the *Godavari District Gazette* of the 30th September 1876, rules to this end were laid down,* and the Committee recommend that they should be generally adopted. It will be most convenient if the Executive Engineer or one of his assistants can accompany the Revenue officer in making his yearly settlement of irrigated lands.

20. In Chapter I. paragraph 12, it has been stated that some economy must be effected in the water consumption of the older canals of the Támraparni, if the irrigation depending on the new Srivaikunthain Anicut is ever to be fully developed. The Committee think it desirable that the Executive Engineer, who has complete control of the water distribution from the new work, should have equal charge over that of the old canals. The first step will be to make careful inquiry as to whether there is any preventible waste. Accurate knowledge must then be acquired of the state of the tanks on the older channels and of the river at all seasons; and having obtained this, the Executive Engineer will be able to decide when to fill up the upper tanks, and when to reserve the water of the occasional freshes for the tanks depending on the new works. Putting restraints on old irrigation is always a task wanting much judgment, and here it will be more difficult than usual, for the people are very tenacious of their rights, and the land is assessed heavily, more than

* See Appendix B.

7,000 acres paying as much as Rs. 20 per acre. But the Committee consider that it is quite practicable to effect the necessary control over these channels, without injury to the cultivation under them, and with advantage to that depending on the Srivaikuntham weir. The Engineer employed should have his duties confined to the Támrapurni Valley, where he will have full occupation for his time.

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## Chapter VI.

*The Sufficiency of Existing Legislation in Madras for the proper Administration of Irrigation and the Treatment of Vested Rights in Water.*

There exists in the Madras Presidency no legislation corresponding to the Canal Acts of Northern India and Bengal,* and after making many inquiries on the subject, the Committee are of opinion that an Irrigation Act is much needed. Without such an Act they consider that the proper distribution of water cannot be ensured, nor can the drainage, which must so often accompany irrigation, be effectively maintained.

2. The main irrigation channel is connected with the ryot's field by a water-course often several miles long, flowing through the lands of one village after another, and discharging water sufficient for each as it passes. Very likely there may not be water enough to supply all simultaneously, in which case each village receives it in turn. If the ryots of a village near the head of this channel choose to throw a few baskets-full of earth into it, there is nothing to prevent their appropriating the whole water-supply to the great injury of the villages further down. Cases of this sort are common. Prosecutions have occurred, but it is usually difficult to identify the offender; and by a ruling of the High Court of Madras, he who diverts to his own use water that rightly belongs to another is not punishable as causing a diminution of the supply of water used for agricultural purposes as defined in Section 430 of the Penal Code. In fact, no interference by individuals with the volume of a non-navigable canal can, it appears, be prevented otherwise than by injunction or civil suit.

3. A large sum has been spent in recent years on the drainage of lands in the Kistna and Godavari Deltas, but there is no summary means of preventing obstructions from being placed in the drains, a common practice of the ryots, with the object of holding up water for the purpose of irrigation, fishing, &c.

4. The Northern India and Bengal Canal Acts effectually meet such cases as these. They authorize the imposition of a fine not exceeding Rs. 50, or of imprisonment not exceeding a month, on anyone who obstructs, "interferes with, increases, or diminishes the supply of "water" in a canal or drainage work;† and where the offender cannot be identified, the person whose land has derived benefit from the obstruction is liable to pay an enhanced water-rate. The inconvenience arising from the absence of any canal legislation was particularly brought to the notice of the committee by Mr. Lister, M.C.S., the officer specially sent to report on the management of the irrigation on the Kurnool Canal.

5. In Chapter IV. the committee have already proposed a draft Act for reviving the old custom of executing minor repairs to irrigation works by unpaid village labour.

6. In this chapter has been included the subject of vested rights in water, for it is probable that without legislation such rights could not always be interfered with, however injurious they might be to the general interests. In Chapter II, paragraph 5, the opinion has been expressed that if it does not involve a breach of faith, it would be of value to have a legislative Act, empowering Government to insist on zamindárs keeping their irrigation works in repair, and it may be necessary to give them some special powers to enable them to do so. But the want of such an Act cannot be said to have been felt yet, merely because no effort has ever been made to induce zamindars to attend to this matter. The same may be said of vested rights in irrigation. The cultivators of Tanjore and Tinnevelly who have irrigated for generations according to their own customs would no doubt resent any interference, and if, in the interest of economy of water, such interference is thought expedient (as the committee think it is in the case of Tinnevelly), it is not improbable that legislation may be necessary to enable Government to act. For although a vested right to the waste of water would hardly be entertained by any Law Court, a claim to an indefinite and excessive quantity might be admitted.

7. The committee think it right to bring to notice how much zamindárs and inamdars often benefit by the improvements effected by Government to irrigation works without being required to pay any corresponding return. Because they formerly had the free use of a precarious water-supply from rain-fed tanks and unreliable village channels, they assert their right to continue irrigating free of charge, although the tanks have been connected with rivers, and the channels rendered secure by anicuts, and this right has sometimes been conceded by Government.

8. As an illustration, may be given the case of the Godavari district, in which 57,305 acres receive irrigation free of charge. This land is situated in zamindáris, and is exempted as *Mamúl pallam*, or lands classed as wet before the canals were made. The water was derived generally from the overflow of the Godavari, or from inundation channels drawn from it, and this source of supply was cut off by the new canals. The proprietors claimed free irrigation for the lands so situated, and the question arose as to what area had been irrigated formerly. It was urged that only so much land should be exempted from charge as was on an average irrigated year by year. Reference was made to the village accounts, but they only showed what was termed the *Gudicut*, or land assessed as wet, and it was never asserted that this area was actually watered in any one year. Government ratified the decision of the Board of Revenue that the zamindárs should have the benefit of all doubt, and be allowed free irrigation for this whole *Gudicut*. The committee believe it would be very difficult sometimes to find out how much the zamindárs have benefited by this decision; but even had the *Gudicut* not represented more land than was yearly watered, they submit that it would have been perfectly just to make the owners pay something in return for the money laid out by Government in making their irrigation certain.

9. Where, as in the case of the Nidathavole and Baharzalli estates, Government have agreed to recognize these claims, no alteration of arrangement seems now possible; but the committee would urge that in future, and especially in dealing with zamindárs situated in the Kistna Delta (where a very material development of irrigation has yet to be effected), the claims of the State should not be entirely subordinated to the desire to deal liberally with the zamindárs.

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## Chapter VII.

*combination of Navigation with Irrigation.*

With the exception of the Madras Irrigation Company's canal, on which boats are not yet plying, the only irrigation canals in the Presidency which are adapted for navigation are those of the Godavari and Kistna deltas, and no one can pass along them without being convinced of the great benefit they are to the people, and that it would have been a serious mistake to have designed them for irrigation alone.

2. When a canal is intended only for irrigation, the one point to be aimed at is to convey the necessary volume of water from the head of the canal to the field as cheaply and with as little waste as possible. So long as the banks and bed are not eroded, the greater the velocity of the water the better, for the size of the channel to be excavated must be increased as the velocity diminishes, and the shorter time the water is in the canal, the less is lost by evaporation. The canal will be laid out as far as possible to avoid cross drainage, and there will be no object in bringing it near towns. The bridges need to be just high enough to allow the water to pass, and if economy of distribution is necessary, and there are a number of channels, the Engineer can manipulate the supply, closing one and opening another as irrigation requires.

3. If the canal is to be navigable, however, other considerations must be kept in view. Where the country is very flat, so that the water in a canal would flow naturally with a velocity not exceeding perhaps two feet per second, boats will ply with ease, and no special provision need be made for navigation on the irrigation channel. But this is exceptional. Supposing the slope of the country such that the velocity of the water would be 2·5 feet per second. As far as irrigation is concerned

* The Northern India Canal and Drainage Act No. VIII. of 1873; the Bengal Irrigation Act No. III. of 1876

† Section 70, Northern India Act; Section 93, Bengal Irrigation Act.

this is not too great,—that is, the banks and bed will not generally be eroded by it. But it is too great a velocity for successful navigation, and if it be resolved that 1·5 feet per second is as great a velocity as is permissible on the navigation canal, it follows that the channel must be increased in size by two-thirds to carry the same volume of water, and three miles of the earth-work of the navigable canal will cost as much as five miles of the canal only fit for irrigation. Not only so; but since the slope of the bed in the navigable canal is less than that of the country, locks and weirs must be built at intervals. The bridges, too, must be made high enough above the water to allow boats to pass, and as this will generally entail long sloping approaches, much will be added to the cost. This reduced slope of bed will favour the deposit of the silt carried in suspension in the water, and periodical dredgings or clearances will be required. It will be an object to bring the canal to centres of trade, and this may involve the cost of carrying it over rivers or drainage lines. When water is in high demand, too, it may be necessary temporarily to close certain branches which checks navigation, or else to allow irrigation to suffer; and the Engineer will have fewer facilities for distributing the water because regulating sluices at the heads of branches will be built more charily since each will involve the expense of a lock.

4. Now, it may easily be supposed that all these drawbacks may be sufficient to make it inexpedient to adapt an irrigation canal for navigation. If the slope of the district were excessive, it would entail a number of expensive locks; if the district were already supplied with a system of good roads or railroads, and the lines of trade were generally at right angles to the canal, frequent bridges would require to be built, and the traffic would be small. If the towns were not conveniently situated, branch canals would be required to approach them.

5. The circumstances, however, of the Godavari and Kistna deltas are most favourable for navigation. Few locks are required to enable the main lines to be carried over the gently sloping country. Few bridges have been required; for when the canals were made, there were no roads, and the cross traffic is now sufficiently provided for by cheap ferries. There has not yet been any difficulty about the water-supply, which is generally equal to the demand at all seasons when the canals are open. On the Kistna, but not on the Godavari canals, silt clearances are expensive. Lastly, no part of the deltas is far from the sea, and ports such as Cocanada and Masulipatam are conveniently situated for export purposes.

6. Government has spent nothing on station-houses and goods-sheds, and but little on wharves. It has taken no particular measures for fostering and encouraging navigation (which was unknown in the district when the canals were made), nor has it ever assumed the functions of a carrier; but private boats carry the trade of these districts; and now that the Buckingham canal is opened along the east coast to Madras, boats are beginning to ply to that city all the way from Cocanada, a distance of nearly 400 miles. The navigation of the Godavari delta is much more complete than that of the Kistna.

7. Cargo boats, from which most of the revenue is derived, have until this year (1878) been licensed to use the canals of either delta on payment of a fee of one rupee per ton burden per annum, but in consideration of the outlay recently incurred in improving navigation in the Godavari delta this rate has now been doubled.

8. Prior to 1871–72 no capital account was kept of the outlay on navigation apart from that on irrigation, but there is no doubt that Government has never gained in direct revenue from the former, for the tollage on the boats has not yet been able to cover the annual working expenses.

The following is the Revenue abstract for 1877 showing a deficit on the two deltas of Rs. 18,371 and Rs. 15,016 respectively. The interest is only on capital spent since 1871–72.

| | Godavari Delta. | | | Kistna Delta. | | |
|---|---|---|---|---|---|---|
| | Receipts. | Charges. | | Receipts. | Charges. | |
| | Rs. 44,742 | Working expenses | Rs. 37,959 | Rs. 14,876 | Working expenses | Rs. 29,584 |
| | | Interest on capital | 25,154 | | Interest on capital | 308 |
| | 44,742 | | 63,113 | 14,876 | | 29,892 |
| Deficit | 18,371 | | | 15,016 | | |
| | 63,113 | | 63,113 | 29,892 | | 29,982 |

Of the above, the tollage from cargo boats on the Godavari delta yielded Rs. 34,250. It is not anticipated that the rate being doubled will drive many boats off the water, so probably there may be a surplus revenue in 1878.

9. Although in direct returns Government has not gained by this navigation, there can be no question as to the indirect advantages arising from this cheap means of transport, which has certainly increased the wealth of the Godavari and Kistna districts, and the revenue derived from its lands, whether irrigated or not. The following statement, showing the increase in the trade of the port of Cocanada during the last thirty years, is a fair indication of the value of the combined irrigation and navigation of the Godavari delta. Two navigable canals terminate in this port, and form almost the only trade routes between it and the interior.

*Statement shewing the Annual Value of the Exports from the Port of Cocanada.*

| | Rs. |
|---|---|
| Mean of the five years ending 1852–53 | 12,71,886 |
| ,, ,, ,, 1857–58 | 20,10,003 |
| ,, ,, ,, 1862–63 | 33,51,024 |
| ,, ,, ,, 1867–68 | 61,11,598 |
| ,, ,, ,, 1872–73 | 76,08,175 |
| ,, ,, ,, 1877–78 | 98,93,519 |

During the famine year 1876–77 rice husked and unhusked to the value of Rs. 52,75,156 was exported from Cocanada.

## Chapter VIII.

*The Madras Irrigation and Canal Company.*

The Madras Irrigation and Canal Company was formed in the year 1858, when the Government of India was inclined to receive very favourably proposals for the construction of remunerative public works, and particularly of canals for irrigation and navigation. The company embraced in its scope the construction of extensive works throughout Southern India; and on the advice of the highest professional authority—Sir A. Cotton—they began with what was termed the Tungabhadra project, the estimated cost of which was 1,345,450*l*.

2. The river Tungabhadra rises in the rainy hill country of West Mysore, and after skirting the dry district of Bellary, it joins the Kistna in that of Kurnool. It was proposed to take from this river a large canal through the Bellary district. Another was to start from its right bank at Sunkasala, a spot near the city of Kurnool, to cross the water-shed separating it from the Pennair, to join that river in the Cuddapah district, and largely to supplement its supply. A weir across the

Pennair was then to divert the united waters into a canal on its southern bank, and ultimately a navigable connexion was to be opened with Nellore and the eastern coast.

3. A great area of land was thus to be irrigated in the districts of Bellary, Kurnool, Cuddapah, and Nellore, while the produce was to be floated without impediment for about 400 miles to the coast, The uncertain supply of the Pennair was to be supplemented by that of the more reliable Tungabhadra, and to ensure the sufficiency of the latter throughout the year without interfering with the delta irrigation of the Kistna, it was proposed to form extensive reservoirs in Mysore and Bellary.

4. To begin with, the company were authorised in 1860 to raise a capital of one million sterling on a Government guarantee of 5 per cent., and it was agreed first to make the canal from Kurnool to Cuddapah.

5. Judging from the signal success of the irrigation works in the delta of the Godavari, no one appears to have doubted that this scheme would prove most successful. One of the officers on the spot, dwelling forcibly on the benefits that would be conferred on the "thirsty "plains" of Kurnool, related how the ryots brightened up when he told them they were to have irrigation, and said that in that case they would not have to leave the district altogether. The shareholders at home were assured that they might confidently expect a return of 31½ per cent. on their investments. It is melancholy to have to point out now how fallacious were all these views, and how many considerations were wholly lost sight of that ought to have received the most careful and deliberate thought. The estimates of the cost of constructing the canal and of the revenue to be expected from it were based on the experience of deltaic tracts. The difficulty of passing through a rugged country, the sparseness of population, the different character of the soil, and other like considerations were overlooked, so that, although the Kurnool canal is a most valuable work of insurance against famine, it can never be otherwise than a financial failure.

6. In this report the Committee propose to consider—

I.—The contract between the Madras Irrigation and Canal Company and the Government.

II.—The obstacles to the success of the enterprise which it is impossible now to remove.

III.—The obstacles which may and ought to be removed.

IV. The measures to be adopted for the better management of the canal.

7. I. The contract with Government.

The capital on which 5 per cent. interest was originally guaranteed was limited to one million sterling. This sum was found insufficient to complete the canal from Súnkásala to Cuddapah, and the "Madras Irrigation "Canal Act of 1866" authorised the company to borrow from the Secretary of State the sum of 600,000*l.* upon debentures payable at the end of five years, and bearing interest at 5 per cent, such interest being a first charge on the revenue of the canal. Section 6 of the above Act empowered the company to borrow what money they required on mortgage or otherwise "for the purpose only "of paying off or discharging the debentures to be given "to the Secretary of State."

8. Doubts, however, arose as to whether the holders of mortgages or bonds under section 6 would be entitled to the same priority with respect to the interest of their money as that to which the Secretary of State was entitled with respect to the interest on his debentures. In order to remove these doubts, and to enable the company to exercise their powers of borrowing, the "Madras Irrigation and Canal Act of 1872" was passed.

This Act provided that the interest of money borrowed under the authority of section 6 of the Act of 1866 should be a first charge on the revenue of the company, 'subject to the debentures held by the Secretary of State "in Council, or such of them as may for the time being "remain undischarged."

9. Under the authority of this Act, the company issued mortgage debentures for 408,955*l.* at 82*l.*,* and from the capital of 335,342 2*l.* thus obtained, they repaid the Secretary of State 228,000*l.* of the 600,000*l.* loan. From the balance of their capital, 107,342 2*l.*, they devoted 82,933*l.* to paying up to June 1877 the interest due to the holders of the debentures of 408,955*l.*

10. The committee cannot gather from any of the Acts passed that the company were justified in applying to the payment of interest any portion of the money so borrowed. It seems to them that the company having raised 335,342–2*l.* were bound by section 6 of the Act of 1866 to pay the whole of it to the Secretary of State, and that the mortgagees were entitled to their interest only from the revenues of the canal. Moreover, in no case could the interest on the mortgage debentures be paid until the Secretary of State's claims for interest on the loan debentures had been satisfied.

11. There is still 372,000*l.* of the Secretary of State's debentures unpaid. If the company are justified in what they have done, there seems nothing to prevent their borrowing, say, 591,045*l.* at 82*l.*, thus obtaining a capital of 484,657*l.*, reserving for interest to the lenders of the 591,045*l.* a sum of 112,657*l.*, and paying the balance, 372,000*l.*, to the Secretary of State. The Secretary of State's debentures would thus be paid off, and the company would have incurred a debt of 408,955*l.* + 591,045*l.* = a million sterling; and then, before their revenue could be applied to reducing the Government guarantee of 5 per cent. to the shareholders of the original capital of one million, the claims of the mortgagees of this second million would require to be satisfied. From this and from what remains to be explained, the prospect of Government being relieved of any portion of the annual outlay of 50,000*l.* (5 per cent. on one million sterling) seems most remote.

12. The contracts entered into with the company did not contemplate the contingency of the revenue receipts ever falling short of the working expenses; and for this no provision was made, although, by clause 23 of the contract of 1863, the Secretary of State was empowered under certain circumstances to cause necessary repairs to be executed to the canal, and to recover their cost from the guaranteed interest. It has happened, however, that for every year up to 1876–77 the revenue has fallen short of the working expenses, and advances have been made by Government to the company. These advances amount Rs. 4,65,412.† In September 1876, the Secretary of State declined to make any further advances. The demand for water in the famine year raised the company's revenue from Rs. 59,625 in the preceding year to Rs. 2,48,193, and gave them a balance of funds in hand; but the Committee think it improbable that the revenue of the current year will cover the cost of the canal's maintenance.

13. II.—The following reasons for the company's want of success are now beyond remedy, and in the opinion of the Committee they render it impossible that it can ever be other than a financial failure:—

(*a.*) The excessive cost of the works in relation to the capacity of the canal.

(*b.*) The nature of a large portion of the soil commanded and the circumstances of the people.

14. The canal from Kurnool to Cuddapah was estimated to cost 415,250*l.* In 1864 it was found that this estimate was likely to be greatly exceeded, while the design and execution of many of the works were equally faulty. The original million and the Secretary of State's loan of 600,000*l.* have now, at the close of 1878, been nearly spent; and although the works are practically finished, it is doubtful whether, without further outlay, the canal is capable of safely carrying the 3,000 cubic feet per second originally proposed.

15. But the revenue would be sufficient to meet even this great outlay, if the demand for irrigation and the area capable of irrigation were anything like what was expected, and if the full supply of the canal were sufficient to water this area. The actual state of affairs is very different. Experience elsewhere forbids us to look for more than 200,000 acres of irrigation with the volume available, or for the irrigation of 300,000 acres out of a total area not much greater. Unfortunately also, it is too evident that water has been brought to a people who do not want it, and will only take it to a very limited extent.

16. The canal was opened throughout its length in 1871. The area of wet cultivation amounts after seven years to only 14,000 acres. The frequent occurence of breaches in the canal had certainly shaken confidence in its stability, and other reasons will be given further on which have checked the extension of irrigation; but under the most favourable circumstances it would not have reached 100,000 acres.

* See statements of receipts and payments to 31st December 1877, attached to the report of the Directors of the Company presented at the Ordinary General Meeting of 30th May 1878.

† See Proceedings, Madras Government, No. 567, dated 12th July 1878.

17. Why irrigation so earnestly sought for elsewhere is so unpopular here is easily explained. Of the soil irrigable from this canal, a large proportion (probably 50 to 60 per cent.) is the well-known black cotton soil locally termed "regada." It is highly fertile, and, with a very slight ploughing, produces in years of ordinary rainfall fine crops of the large millet known throughout India as *cholum*, *jonna* or *jowar*, the *Sorghum vulgare* of botany.

18. The dry lands of Kurnool yield as much as 1,000 lbs. of this nutritious grain per acre. The ease with which it is cultivated precisely suits the sparse population, not exceeding on an average 130 to the square mile. It is the staple food of the people, and the straw is the best fodder for the fine cattle on which they pride themselves. It is true that they consume rice to a small extent, and have far to send for it. If they understood how to grow it too, rice cultivation is the more profitable. But it requires a great deal of manual labour, and is considered locally to need a great deal of manure which they cannot always command. It is a new thing, and therefore a distasteful thing, and its straw is an inferior fodder. This is the main reason why the Kurnool canal has been such a failure. Had its cost not exceeded the original estimate, even then it would not have paid the guaranteed interest for many years.

19. The chances of extending rice cultivation would be improved were it possible to secure a second crop. The inducement to terrace and manure his lands might be increased if the peasant could count on two crops a year. But as the supply in the canal is only certain for seven months, this is impossible. It was to meet this difficulty, and to keep up unbroken navigation, that it was originally proposed to store the upper waters of the Tungabhadra in reservoirs. But the profits of these works would not, as things are, be commensurate with their cost.

20. In ordinary years, the millet crop requires no irrigation; indeed it often suffers from excessive rain. But in years of drought it perishes if unwatered, and it cannot be doubted that in such seasons the ryots will in time gladly avail themselves of the canal. This is the one bright feature in the project. In 1875–76 the area of millet watered was only 1,020 acres. In the famine of 1876–77 it rose to 66,901 acres, and, although a good crop was not obtained over all the area, it might have been even larger had the administration been more perfect. Should another such famine occur, the canal should be able to water 200,000 acres of millet and produce food to the value of 80 lakhs of rupees, enough to support a million of people with their cattle for five months.

21. III.—All the obstacles to the success of the Kurnool canal which can be removed may be included under the term "faulty administration."

It was laid down from the first that the Company were to deal with Government alone and not with the ryot. Government were to buy water from the Company and the ryot from Goverment. A series of rules was framed in 1864, based on the supposition that the water would be in high demand. To secure the supply to those who asked for it in proper time, applications for water were required to be made before the beginning of the irrigation season. All irrigated lands were to be registered, and the Government were to make over to the Company whatever revenue they realised. It was believed that the ordinary village organisation was sufficient to deal with this new thing—irrigation. The village accountant or *karnam* was to receive applications, to open registers, to send in monthly reports. The tahsildars and revenue inspectors were to add to their multifarious duties the distribution and control of the water after it left the Company's sluices, and no provision was made for remunerating any of these officials for their additional trouble.

22. Owing to its climate, no district in Madras is more unpopular than Kurnool. Changes are frequent among its Collectors. Revenue subordinates who seek for promotion, or whose ability commands interest, are always on the look out for employment in other districts. It is not to be wondered at then if the Revenue administration is not as efficient here as elsewhere, or if the Revenue subordinates perform their new duties in a somewhat perfunctory manner.

The officers of the Company complained that the *karnams* did not register water applications, that the ryot had no means of learning the terms on which he might irrigate or how he could get water, and that irrigation was thereby retarded. The Revenue officers denied the truth of these complaints and said the ryot did not take water because he did not want it, and because the frequent accidents to the canal made his rice crop uncertain. Government after much discussion consented to the Company's own officers registering applications and measuring up the crops. But this did not do much good. The Company's officers continued to complain of the indifference of the Revenue subordinates. The Revenue officers retorted that the complaints of the Company were exaggerated, that they showed a disregard to the feelings and the prejudices of the ryots, and were harsh in their treatment of them. Complaints continued to be made, and Government were at length convinced that the appointment of a special Revenue officer of standing was necessary to ascertain the facts, to see that the rules were carried out, and to suggest such improvement as might be likely to conduce to a more efficient administration.

23. To this duty Mr. A Lister, M.C.S., was nominated in December 1877. Mr. Lister's careful and exhaustive report No. 252, dated 15th August 1878, has been of great help to this Committee. They have studied it with interest, read up much correspondence, and taken evidence from various individuals in the Kurnool and Cuddapah Districts. Although, for reasons already given, they do not think that under the best auspices the canal could have been a success, they consider Mr. Lister is warranted in ascribing its failure partially to

"(1.) The absence of good revenue administration in the taluks traversed by the canal;
(2.) The unsatisfactory relations which have existed between revenue officers and the Company;
(3.) The feeling of antagonism that has arisen between the Company and the ryots;
* * * * *
(6.) The whole system of management which exposes the ryots to worries and exaction."

24. It is not necessary here to adduce evidence on any of these points save the last, nor will they be dwelt on further. Friction will arise where there is a dual administration. Mismanagement will arise when people are expected to perform duties they do not understand. Friction is often seen between two departments of the same Government. It is more likely to occur between officers of a Government and of a Company. The introduction of irrigation into Kurnool and Cuddapah is a difficult task, requiring much tact and special knowledge. No wonder that it has failed when these qualifications were wanting.

25. The part of the canal administration which has been the chief source of annoyance to the ryot has been the system of applications for water. As first arranged, the ryot had to apply to his village *karnam*, and afterwards he might go to the canal overseer instead; but in either case the application had to be recorded. If he watered his field without this previous application, if the *karnam* forgot to record it, or if by mistake he recorded 8 acres instead of 4, the ryot was subject to a fine for anything in excess of the recorded area. In the year 1876–77 no less than 15 per cent. of the whole area irrigated was thus subjected to fine. On one village, Yerraguntla, Taluk Sirvail, a fine of Rs. 161 was inflicted in spite of the ryots' positive assurance and the *karnam's* admission that they had asked him to register their names for water, and that he had neglected to do so. The committee are afraid that this is not the only case where the ryot has been fined for no fault of his, and where it is evident that, if the company were entitled to the amount of the fine, it should have been paid by the *karnam* or by the Government whose officer the *karnam* is.

26. On this canal, where the ryot is so lukewarm about irrigation, it is particularly desirable to remove all impediments to his taking water, and this system of applications has been a distinct impediment, especially in the irrigation of what are termed dry crops. The ryot hesitates long before he waters his *cholum* field. His fathers never did so. He is not quite sure whether the canal water will be good for the crop. He will have to pay Rs. 2 per acre for it, and if he holds back and it should happen to rain next day he will be saved this sum. It may easily be conceived that in this frame of mind he will be deterred if he has to go in search of the *karnam*, who may perhaps be absent at the taluk head-quarters, and even then he is not quite certain that his application will be registered, and he has a shrewd suspicion that he may incur a fine.

It is the opinion of all whom the Committee have consulted that this system works badly, and that it should be abolished.

27. The Company at present are required to bring the water to the field of every ryot, and the field channels are not looked on as the property of any particular individual. The opinion of the Committee will be stated further on, that the company should not have anything to do with the distribution of water; but whether or not this be approved, they consider it essential that the company's interference should not go further than the sluice or sluices supplying a village, and that the individual distribution should rest with the village officers.

The ryot as at present would have to ask one of these officers to let him turn the water on to his field, and the *karnam* in due course would record the irrigated area in his accounts; but whether he did so or not would be immaterial to the ryot, as long as he got the water he wanted, and the amount he would have to pay would depend not on what the *karnam* had recorded, but on what the irrigated area proved to be.

28. The settlement and measurement of the fields irrigated should always be made before the crop is cut. This is seldom if ever done on the Kurnool canal. Measurements are made in August, or even later, of fields from which the irrigated crops have been cut in March, and where perhaps another crop has been sown. In such cases there is no possibility of proving from the field itself whether it has been watered or not. The proof of irrigation has been made still more impossible sometimes by the ryot not having been told for months after the measurements what he will have to pay. It is the rule that he should have a bill termed a *puttah* presented to him, explaining his charge before he is called on to pay it, but this rule has not always been observed. If full intimation were given in each village of the date on which the irrigation would be measured, so that the ryots concerned might be present if they liked, and if their *puttahs* were presented to them before the harvest, the opportunities for fraud would be greatly reduced. The committee know of no reason why this should not be done on the Kurnool canal as it is successfully elsewhere.

29. Although Mr. Lister thinks the canal rates were fixed too high at first, he does not recommend that they should now be reduced. On this very important matter, the Committee find it difficult to arrive at a conclusion. In 1862, Government started with a rate of Rs. 3 per acre on each crop watered, but a few months afterwards, considering there could be only one crop in the year, they changed it to Rs. 4.* In 1865, the company urged that their works had been of so costly a nature that a higher rate was necessary to enable them to pay their dividends. The Madras Government on a full review of the case† thereupon sanctioned a rate of Rs. 6 per acre on rice irrigation. This rate was fixed on the consideration that prices were then high and the country prosperous. The contingency does not seem to have been contemplated that the ryot might decline to irrigate on these terms. In 1868, the collector of Kurnool pointed out that the rate was too high and that irrigation was falling off, and the Consulting Engineer to Government suggested an initial rate of Rs. 4 and an annual increase of Re. 1 up to Rs. 6. Government‡ left the company to decide whether they would adopt this suggestion or adhere to their Rs. 6 rate. They did the latter. In 1874 new rules were framed.§ Crops were divided into three classes—class (1) "requiring a con- "tinuous supply," rice, sugarcane, betel-leaves, &c.; class (2) "requiring frequent floodings," chiefly garden crops; class (3) "requiring occasional floodings," *cholum* and *ragi*. The rates for these were Rs. 6, Rs. 4, and Rs. 2 per acre respectively; and with reference to the first, where the field had been properly terraced and embanked, the charge was raised by yearly increments of Re. 1 from Rs. 3 to Rs. 6. For these rates, rice received its supply throughout the season, but other crops only up to 31st December. After that date a rate of Re. 1 per mensem up to the closing of the canal was fixed. Provision was made specially for the filling of tanks. The rules of 1874 were revised last year, but the water rates were not changed.‖

30. The statistics of irrigation are so incomplete that it is difficult to say how these rules have worked. Until Mr. Lister's appointment, no separate record was kept of the area of second class irrigation at Rs. 4 apart from that of rice in its second year at the same rate. But it appears generally, as Mr. Lister remarks, that about "one-half of the land taken up newly for rice is aban- "doned the following year, and only one-third of it is "persevered with in the third year."

This seems to indicate that the rates are too high, but nowhere did he hear complaints on the subject, and, as he points out, the first year is often one of experiment. At its conclusion, the ryot, finding his rice crop has not succeeded, or that it has involved more labour or manure than he can afford, goes back to his original *jonnat*.

31. Mr. Latham, the Chief Engineer of the Company, urges with justice that the present rates have really not had a fair trial. If that for rice were reduced at once to say Rs. 4, there would be temporary falling off of the revenue, and the Committee do not feel confident that this would be compensated for afterwards. At the same time it is evident that irrigation does not progress as it should; and it seems anomalous that the water rate on the Kurnool canal should be Rs. 6 per acre, while in the Kistna and Godavari deltas, where irrigation is eagerly sought for, the rate is only Rs. 4.

32. According to the best evidence, rice lands do not yield a full return for the first year or two. In some places the cost of terracing and manuring is much greater than in others. The Committee know of no reason why one initial rate should be charged throughout the canal, and in paragraph 40 they will submit some suggestions on this point.

33. The arrangements for supplying the few tanks on the line of the canal have not hitherto been satisfactory; but Mr. Lister and Mr. Latham have now agreed on what seem equitable terms which meet also the peculiar circumstances of the holders of wet *inam* lands.

34. The rate for millet irrigation, Rs. 2 per acre, is not too high. In years of ordinary rainfall it will not be irrigated at all, and in seasons of drought the ryot can well afford to pay so much for it.

35. Although it is not an obstacle to the spread of irrigation, this seems the right place to notice the burden placed on the revenue of the Kurnool canal by the extravagant charges for establishment.* The Committee have no means of knowing the charges made at home on account of direction, &c. In India there are a chief engineer and manager drawing Rs. 2,500, besides a fixed travelling allowance of Rs. 200 per mensem, and four engineers drawing altogether Rs. 2,390 per mensem, making an annual charge of Rs. 61,080. Were this a Government canal, probably one executive engineer and three assistant engineers would be thought sufficient, and their salaries would amount to less than Rs. 30,000. Government have repeatedly noticed the high salary still drawn by the chief engineer, although the outlay on construction has for several years been only nominal; but the Secretary of State has considered it inexpedient to bring pressure on the Company to lower it, and of their own accord they seem indisposed to do so. The Committee do not think that the total charges for maintenance are high, but they would like to see less spent on establishment and more on works; and the two engineer members of the Committee having inspected a large portion of the canal do not consider that it is in all respects kept in the efficiency it should be.*

36. IV.—In paragraphs 25 to 28 the Committee have already made recommendations for an improved management of the canal. There remain some others to bring forward, and in doing so it has been assumed that Government are not in a position to buy out the Company, and that as heretofore the Secretary of State will treat them with some indulgence, without which it is difficult to see how they can carry on at all. In the opinion of the Committee, the most satisfactory arrangement between the Company and Government would be that the latter should purchase the water by volume and take on itself all the details of its distribution. The Company would then be required to maintain a certain depth of water at certain points agreed on, and it would be paid accordingly. The Company would be responsible for the maintenance of the canal and the irrigation

* Proceedings, Madras Government, 24th May 1862 and 24th May 1863.

† Proceedings, Madras Government, No. 1348, dated 1st June 1866.

‡ Proceedings, Madras Government, No. 526, dated 1st March 1869.

§ Proceedings, Madras Government, No. 830, dated 3rd July 1874.

‖ Proceedings, Madras Government, No. 3359, dated 5th December 1877.

* In this remark items such as the following are referred to: the state of repair of several bridges which are badly cracked, the want of pointing; the trees and vegetation requiring to be removed from masonry works; the state of the flooring of culverts; the disrepair of canal buildings; the earthen banks of section 7.

sluices. Where new ones were required they would be bound to build them. But the opening and closing of these sluices, the maintenance of existing and the construction of new distributary channels, and the whole management of the irrigation, would be in the hands of Government. By this plan the revenue of the Company would be a round sum representing the value of the water expended, and it would cease to be any concern of theirs whether the water were used to the utmost advantage or not. The Government would, as at present, charge the ryot according to the area watered, and they could then fix the water rates without any reference to the Company. They would be the losers in wet and the gainers in dry years. In the latter, too, they would have a valuable freedom of action in prompt water distribution, which is impossible at present. All friction would then cease between the officers of Government and of the Company, for distinct limits would be set to the functions of each.

37. *Prima facie*, this would be the best arrangement; but the Committee see difficulties in the way of its execution. The terms on which the contracts were framed, the absence of sufficient irrigation statistics since the canal has been opened, the uncertainty as to the volume wasted, and the extent to which the bed is likely to silt up, all form practical difficulties by no means insurmountable, but still to be avoided if possible. The Committee therefore suggest another basis of agreement which seems to them quite feasible, namely, that Government should annually pay to the Company a sum estimated from the revenue of the last few years, and increasing year by year on the assumption that irrigation will extend, and that Government shall then be entitled to take as much water as circumstances may render desirable within the capacities of the several sections of the canal. As proposed in the last paragraph, the Company would keep the canal works in repair, and the Government would have charge of the water distribution. The Company would engage to keep up the depth of water required within certain limits, and in the event of their failing to do so they would be liable to make good any remissions of revenue caused by their short supply.

38. In the following table the progress of the irrigation is shown year by year from the beginning :—

| Year. | Acres irrigated. | Revenue. |
|---|---|---|
| | | Rs. |
| 1863 64 | 18 | 73 |
| 1864–65 | 192 | 684 |
| 1865–66 | 816 | 3,543 |
| 1866–67 | 1,396 | 10,162 |
| 1867 68 | 1,138 | 10,084 |
| 1868 69 | 1,078 | 10,000 |
| 1869 70 | 1,164 | 9,803 |
| 1870–71 | 1,516 | 6,700 |
| 1871–72 | 7,536 | 32,764 |
| 1872 73 | 9,405 | 48,455 |
| 1873 74 | 13,355 | 66,610 |
| 1874–75 | 13,408 | 49,385 |
| 1875–76 | 14,763 | 56,357 |
| 1876–77 | 90,285 | 2,47,351 |
| 1877–78 | 50,918 | 1,49,130 |

In the year 1871–72 the canal was opened throughout its length; 1874–75 was exceptionally wet; in 1876 77 the great famine reached its greatest intensity; and in 1877 78 the rains did not set in till September, and the irrigation was abnormal. In any forecasts for the future, the famine year must be thrown out altogether, except so far as famine always does give an impetus to irrigation. Considering this, the dry year 1877 78 might be balanced against the wet year 1874–75. The mean revenue of the three years beginning 1871–72, is Rs. 52,112, and of the three years 1874 75, 1875–76, and 1877–78, is Rs. 87,995. This denotes an average yearly increase of about Rs. 12,000. The Company relieved of the water distribution will be able to effect a saving in establishment of, perhaps, Rs. 20,000 per annum apart from economy in salaries, and a corresponding increase of burden will be laid on Government. Taking this into account on the one hand, and on the other the hope that by the arrangements now proposed irrigation will advance with a progress perhaps twice as fast as it has hitherto, the Committee consider that Government would be acting fairly and liberally if, for the water supply of the year 1879 80, they were to offer the Company Rs. 1,20,000, and to increase that sum by Rs. 25,000 each successive year up to 1887 88, after which Government will have the option of taking over the canal altogether.

39. But the Committee do not consider that this change would be enough. They have not had reason to form a very high opinion of the subordinate Revenue officials of Kurnool and Cuddapah, and under no circumstances do they think that the spread of irrigation on this canal can be effected without an establishment specially trained and employed for the purpose. The conditions here are totally different from what they are in Tanjore, where irrigation has gone on unchanged for generations, or in the deltas of the Kistna and Godavari, where it is eagerly demanded.

40. Mr. Lister's appointment has been of undoubted benefit, and it seems necessary for the future to retain an officer in special charge of the irrigation. The cause has been injured hitherto from want of elasticity in management. The only way of securing this elasticity is to entrust the management of the irrigation to an officer possessing the confidence of Government, and to give him very free powers of action. He might be termed, perhaps, the Superintendent of Irrigation. Such an officer must be of strong constitution (for it is an unhealthy country), of active habits, and of sound judgment, taking a kindly interest in the agricultural classes, having a good knowledge of their language, some acquaintance with the native system of cultivation, and some experience in a canal irrigated district. It is not essential that he should be an Engineer, but if not, he should possess an aptitude for minor engineering work. He should also acquire some knowledge of the flow of water. To give him the necessary authority, he should have magisterial powers. The salary of such an officer should be about Rs. 1,200 per mensem, and he should get the appointment only on the understanding that, health permitting, he should hold it for at least five years.

41. It is questionable whether an officer possessing the necessary experience and qualifications, and who would accept these conditions, could be found in the ranks of the Covenanted Civil Service. But the Committee believe that he could be had from the Revenue Survey or Settlement or from the Irrigation Department. In his magisterial duties, he should be under the control of the District Magistrate, but in other respects he should correspond direct with the Board of Revenue. In all irrigation matters, the Revenue subordinates should be bound to obey his orders, and it would be necessary also to give him a subordinate establishment of inspectors, measuring amins, patrols, &c. Including his own pay, the whole establishment would cost perhaps Rs. 35,000 per annum. Against this there would be as a set off the estimated saving of Rs. 20,000 to the Company, and the cost of the present Revenue officer whose employment was not intended to be permanent, but which would require to be so, unless some other arrangement were introduced.

42. Government having laid down very generally the principles to be followed, the Superintendent of Irrigation should be left unfettered to act, only reporting what he has done. The Committee go so far as to recommend that he should be allowed within certain limits to fix the water rates to be levied for, say, the next five years, not insisting on all villages paying the same rate, but taking into account the peculiar circumstances of each. In some, for instance, there is no question that rice cultivation will succeed. The ryots are numerous and well-to-do, and the land could easily be terraced. In other villages precisely the opposite conditions exist. To give the irrigation the best possible chance, varying rates might be demanded. The Irrigation Superintendent should be vested with the powers of a Collector under the Land Improvement Act XXVI. of 1871, and should be encouraged to make free use of its provisions. If this officer were an Engineer, he might himself execute all improvements and extensions of distributary channels, and this would be most convenient. If not, the agency of the Public Works Department would require to be called in to do all requiring technical skill.

43. The Committee are aware that their proposals involve procedure which is supported by no precedent, and the results of which cannot be demonstrated; but they see no chance of the State being materially relieved of a serious and constantly increasing financial burden, unless the unreliable traditions of the past be abandoned.

44. Navigation is now about to begin on the Kurnool canal, and the Company, instead of deriving their profits as Government do on the State canals by a tollage on the boats, intend to take up the position of carriers, to allow only their own boats to use the canal, and to

charge for the carriage of passengers and goods precisely as on a railway. This has involved the purchase of an extensive fleet of cargo boats from England, and the erection of wharves, goods-sheds, &c. which are not provided on the State canals. The Committee have no data from which to form any forecast of the profits likely to accrue from this traffic, but they are not sanguine as to the Company's thereby improving very much their financial position. Nor do they look for a rapid increase in rice irrigation, owing to the facilities which boat carriage will afford for taking it to distant markets. They have no doubt, however, that the Kurnool district will greatly benefit by the introduction of cheap navigation.

45. One point remains to be mentioned before closing this chapter. In Chapters I. and V. has been noticed the irrigation from the Pennair River in the Nellore District, and especially the Sangam project. Were the supply of that river more certain, it would be easier to replenish the tanks depending on it, and the channels leading to these works would not require to be so large or costly as now, when advantage has to be taken of very short freshes. Should the ryots of Kurnool persist in abstaining from irrigation, the Company's canal may be employed as a valuable means of transferring water from the Tungabhadra to the Pennair, where it will be highly prized in the rice fields of Nellore.

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## CHAPTER IX.

*The Present Condition and the Future Prospects of Irrigation Works in Orissa.*

The Province of Orissa covers an area of 7,355 square miles, of which about two-thirds is cultivated. It contains a population slightly exceeding three millions, and is divided into the three districts of Cuttack, Pooree, and Balasore, of which Cuttack is the most populous, containing 470 to the square mile. The land is held on the ordinary Zamindári tenure of Bengal. Its revenue was fixed at the settlement of 1837 at Rs. 17,05,594, and this was renewed for 30 years in 1867, when the Province was just recovering from its terrible famine. The average rainfall is from 55 to 65 inches. The quantity is generally ample for cultivation, but its distribution throughout the year is so irregular that the crops are not unfrequently injured. In 1865 the rainfall was 17·45 inches, and the result was famine. In 1873 the rainfall was 35·84 inches, and tolerable crops were secured.* The food of the people is rice, and it is almost entirely grown in the crop sown in June and reaped in December.

2. The characteristics of the Province which have most struck the Irrigation Committee are the remarkable manner in which it is intersected by rivers, and the imperfect means notwithstanding of communicating with the surrounding districts.

Orissa is traversed by seven rivers, of which by far the largest is the Mahanuddy. In the rainy season they are subject to great floods, which sweep across the country simultaneously, causing extensive damage. In the hot months most of them dwindle down to paltry streams. The Mahanuddy has a drainage area of 18,200 square miles above its delta. Its flood discharge is 1,570,000 cubic feet, and it has been measured as low as 400 cubic feet per second. These rivers keep splitting into branches, and again re-uniting so as to form a labyrinth of waters discharging into numerous creeks which run inland from the sea, and intersecting a long belt of land feverish and jungle-clad. Although there is a seaboard running the whole length of Orissa, 250 miles, it contains only two places of secure anchorage, False Point and Chandballi on the Baiturni River, about 20 miles from the coast, and the communications between these ports and the interior are still imperfect. There is also a metalled road to Calcutta 260 miles from Cuttack, but the rivers are unbridged, so that for some months every year it is almost closed. The originators of irrigation works in Orissa found, therefore, that they had difficulties to face, unknown elsewhere, and it was evident that no system could meet the wants of the Province which did not provide facilities for navigation and protection against floods.

3. The Committee have found an unusually large mass of literature connected with irrigation in Orissa. The subject has assumed different lights in a comparatively short period of years. Officers of great local experience and professional knowledge have entertained different views. Coming then as strangers to the Province, and with only a limited time at their disposal, they feel diffident in advancing opinions as to the promise of the future, or the measures to be recommended, and they cannot enter closely into the details of the proposals they have to make.

4. On 1st April 1878 the capital charges against irrigation works in Orissa amounted to Rs. 2,29,91,65*l*. In return for this expenditure Government possess—

(*a*) 227 miles of irrigation canals, of which—
(*b*) 160 miles are navigable;
(*c*) 548 miles of distributary channels and 102 miles of village channels capable of irrigating 182,950 acres;
(*d*) embankments affording protection from floods to 621,400 acres, or nearly 1,000 square miles.

With more distributory channels the existing canals are capable of irrigating an additional area of 311,850 acres. The irrigation of the current year, which is the greatest yet effected, amounts to 130,000 acres, bearing a revenue of Rs. 1,95,000. The navigation revenue this year will be about Rs. 70,000.

5. The canals of Orissa and Midnapur were actually begun in November 1863 by the East India Irrigation and Canal Company, and were taken over by Government on the 1st January 1869, on payment to the Company of 1,040,050*l*. This was a very liberal payment. The Company's 20*l*. shares were not then worth more than 16*l*. in the market. Government bought them for 21*l*. A compensation bonus of 50,000*l*. was paid to the Company's officers, besides 57,000*l*. on account of home charges for direction. It may be safely said that for the million of money paid the Government bought works in Orissa and Midnapur intrinsically not worth more 700,000*l*.* This should be remembered in calculating the financial value of irrigation in Orissa. Viewed in a financial light, these works are crushed under the weight of their interest charges. If it were possible (which at present it is not) to obtain one rupee of net revenue for every acre watered, it would be necessary to irrigate 175,000 acres simply to pay the interest of the money paid to the Company over and above the value of the property bought.†

6. For several years the prospects of irrigation in Orissa were most discouraging. As in the case of the Kurnool canal, when irrigation works were started here the success attending them in the Godavari delta was quoted, and with more reason. Here, too, was a deltaic country, not very unlike the Godavari district. Here, too, the staple food was rice. One very important difference there was that here the rainfall was 55 inches or more, in the Godavari delta it was about 37 inches, and it may be added the cultivators of Orissa are far inferior to those of the southern deltas, and are noted for their want of energy and enterprise. Although they had just gone through a famine, they were indifferent to irrigation. The water-rates were unwisely fixed at first as high as Rs. 5, and these were by degrees lowered to Re. 1 per acre. still the ryot was determined not to take water if he could grow his rice without it, and frequently when he did take it, it was difficult to exact the revenue from him. In the southern deltas the existence of a crop of rice at all is evidence of irrigation. Here it is grown of tolerable quality with the help of rain alone The ryot was ready to deny that he had used canal water, and when he was proved to be lying, it was difficult to punish him until the Canal Act of 1876 was

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* Note by Lieutenant J. W. Ottley, R.E., dated 10th December 1874.

| | Rs. |
|---|---|
| Actual cost of works in Orissa up to 1st January 1869 | 32,67,996 |
| Add 40 per cent. for establishment and tools and plant | 13,07,170 |
| Total Orissa works | 45,75,686 |
| Actual cost of works in Midnapur | 16,99,639 |
| Add 40 per cent. for establishment and tools and plant | 6,79,867 |
| | 23,79,556 |
| Total for works, Orissa and Midnapur | 69,54,651 |

† As if the Orissa irrigation works were not already sufficiently burdened, there seems rather a tendency to charge them with expenses hardly belonging to them. It may be doubted, for instance, whether all the outlay on flood embankments is fairly chargeable to irrigation, or the total cost of the cadastral survey which will be as valuable to the Revenue as to the Irrigation Department. Nor does it seem quite fair to impose on this department the maintenance of the massive flood walls built by the Mahrattas to defend Cuttack from the floods of the Kathjori, since all that the Irrigation Department has to do with the matter has been to build, some miles higher up, the Naraj weir, of which the effect is to lessen these floods.

passed. The statistics of irrigation year by year are given in the following table :—

AREA OF LANDS IRRIGATED YEAR BY YEAR.

| Year. | Acres Leased. | Years. | Acres Leased. |
|---|---|---|---|
| 1869–70 - | 1,729 | 1874–75 - | 22,459 |
| 1870–71 - | 22,128 | 1875–76 - | 18,409 |
| 1871–72 - | 11,653 | 1876–77 - | 30,383 |
| 1872–73 - | 4,753 | 1877–78 - | 98,495 |
| 1873–74 - | 12,571 | | |

7. Until two years ago, writers on the subject of Orissa Irrigation have been generally despondent as to its ever being much in request. It is satisfactory to have to report the dawn of better things. Perhaps terrified by rumours of the Madras famine, and certainly alive to the rise it occasioned in prices, the Ooriyas seem at last to have overcome their dislike to irrigation. The area of rice watered in 1876–77 was 26,070 acres. In 1877–78 it was 95,080 acres. In 1878–79 it is estimated that 130,000 acres will have taken water, and that this is not likely to be exceptional is proved by the readiness of the ryots to enter into five years' contracts to pay a water-rate of Rs. 1–8 for every acre in their villages which they cultivate,* Already leases have been taken on the above terms for 90,000 acres, and the Revenue Superintendent, Mr. Wylly, is sanguine as to the whole of the irrigation being soon given on such leases.

8. It will be noticed that it has been considered necessary to fix a very low rate for irrigation in Orissa. For this there were several reasons. Where rice can be grown without canal water at all, sufficient to supply the wants of a populous province and to allow a margin for exportation, it is evident that irrigation is not so valuable as where the crop cannot be raised without it. In the Madras Presidency, where the ryotwari tenure prevails, the cultivator knows that beyond the Government assessment he will be liable to no other charge if he irrigates. In Orissa a large proportion of the ryots (variously estimated at from 30 to 50 per cent. of the whole) are mere tenants-at-will of the zamindar, who, if he pleases, may raise their rent and deprive them of every rupee of the benefit they receive from irrigation. In a minute of 19th December 1874 by Sir Richard Temple, then Lieutenant-Governor of Bengal, he recorded—

"that the zamindárs and landlords do not at all oppose the taking of canal water by their ryots, but, on the contrary, rather encourage it."

Some of the local officers whom the Committee have consulted hold by no means this opinion.

9. Another reason for fixing a low water-rate is that prices in Orissa are exceptionally low. This may be seen from the price of common rice given in the following table compiled from the gazettes. It will be noticed that in every column the prices at Cuttack or Balasore are lower than in any of the other districts quoted. Of course the Madras famine has largely affected the prices during 1877 and 1878.

PRICES in Seers (2 lbs.) per Rupee of Rice in the following Districts.

| | | 1875. | | 1876. | | 1877. | | 1878. | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1st January. | 1st July. | 1st January. | 1st July. | 1st January. | 1st July. | 1st January. | 1st July. |
| BENGAL | Nuddea | 16·0 | 16·0 | 21·5 | 13·5 | 14·8 | 14·8 | 13·5 | 10·1 |
| | Burdwan | 20·0 | 15·0 | 26·4 | 22·8 | 16·4 | 16·4 | 16·0 | 12·8 |
| | Hooghly | 15·8 | 16·0 | 18·0 | 20·0 | 15·0 | 13·0 | 13·8 | 10·0 |
| | Midnapur | 20·0 | 14·0 | 26·0 | 26·0 | 18·0 | 21·0 | 16·0 | 12·0 |
| ORISSA | Balasore | 27·9 | 24·0 | — | 29·0 | 22·0 | 25·0 | 18·0 | 16·0 |
| | Cuttack | 28·14 | 22·6 | 30·3 | 25·0 | 21·0 | 17·1 | 14·7 | 13·2 |
| | Pooree | 26·0 | 23·1 | 28·4 | 21·0 | 17·1 | 15·1 | 11·3 | 10·8 |
| MADRAS | Ganjam | 26·1 | 19·6 | 26·1 | 22·8 | — | 13·0 | 8·7 | 8·2 |
| | Vizagapatam | 15·8 | 14·7 | 15·8 | 13·6 | 9·6 | 9·0 | 6·8 | 6·2 |
| | Godavari | 19·0 | 21·0 | 21·5 | 19·2 | 9·8 | 9·1 | 8·5 | 7·5 |
| | Kistna | 18·7 | 19·6 | 20·8 | 18·7 | 8·1 | 9·0 | 8·1 | 8·1 |
| | Nellore | 15·0 | 16·0 | 17·5 | 16·0 | 7·0 | 7·0 | 6·5 | 9·5 |

10. The Committee have been unable to obtain any accurate information as to whether the cheapness of rice in Orissa is at all due to its being in itself of inferior quality. But it appears that the average outturn per acre is only about 1,200 lbs. of paddy or 700 lbs. of rice, while Mr. Dalyell, M.C.S., states in his memoir on the Madras famine of 1866 that in that Presidency 1,120 lbs. of paddy is the average outturn per acre on unirrigated and 2,240 lbs. on irrigated land. In Orissa a higher outturn per acre is obtained from the best quality of unirrigated rice, but this is only grown in low favourably situated fields. From Mr. Apjohn's experiments in Midnapur (of which more will be said in the next chapter), it appears that on an average of some years the outturn of irrigated rice exceeded that of unirrigated by 40 and 22 per cent. in different parts of the district, although in years of good rainfall the yield of the one was quite equal to that of the other. Probably similar results would be found in Orissa and once the ryot has recognised this it may be hoped that he will grow the best description of rice wherever he can secure canal water, and that he will be willing to pay more for irrigation than he does at present.

11. On the 1st April 1878, the capital account of the Orissa canals stood as follows :

| | Rs. |
|---|---|
| Works - - - | 1,20,51,337 |
| Establishment - - - | 33,95,454 |
| Tools and plant - - | 16,59,808 |
| Suspense account - - - | 3,53,773 |
| Accumulated interest charges | 52,10,789 |
| Capitalised abatement of land revenue - - - - | 30,122 |
| Total - - | 2,30,42,080 |
| Deduct receipts on capital account - - - - | 50,389 |
| Total - - | 2,29,91,691 |
| Interest at 4½ per cent. on this sum amounts to - - - | 10,34,626 |
| And the average cost of maintenance has been during the last four years - - - | 2,08,694 |
| Total - - | 12,43,320 |

Hence, to yield a profit of 4½ per cent. on the capital outlay, a gross revenue of nearly 12½ lakhs must be derived from the Orissa canals. Assume that the navigation tollage amounts to 1 lakh, and 11½ lakhs must be obtained from irrigation ; and if the rate be only Rs. 1–8 per acre,

* In this is understood rice cultivation alone. The irrigation season practically lasts only from May to November; for although there is a cold weather crop grown and sometimes watered (consisting chiefly of cotton), it amounted only to 3·12 per cent. of the whole irrigation of 1877 78, and it does not appear likely to increase. A special rate of Rs. 6 is charged for sugarcane, but 336 acres is the highest area yet watered in one season.

this infers the irrigation of 767,000 acres, or nearly as much as will be shown in paragraph 16 to be ultimately rendered irrigable by an additional outlay of 136 lakhs.

12. It will be seen that if irrigation in Orissa is ever to be financially successful (about which the Committee are not very hopeful), that success must be attained—

1. By a large increase in the area watered.
2. By a large outturn of crop per acre, and perhaps by the production of a superior class of rice.
3. By increased facilities for communicating with the outer world, whereby prices will approximate to those obtaining in the neighbouring districts.
4. By the protection by some means of the ryot from the rapacity of his landlord, should it be clearly proved that the latter is depriving him of the benefits he gets from irrigation; or by such an owner's rate on the landlord as will absorb all the profits of his rapacity.

13. As regards the extension of irrigation works in Orissa, the Committee have had to consider whether it would be better that Government should abstain from such extension altogether, confining itself to the completion of the distributaries necessary to bring within reach all the lands commanded by the present canals, or whether the financial position would be improved by the judicious outlay of further funds, and if so, how this could best be done so as to increase the irrigation revenue, and at the same time to render Orissa more prosperous and less liable to famine.

14, It has been assumed that if it is certain that the ryots will take the water, Government will certainly complete the distributaries belonging to the existing canals. For it wants very little proof to demonstrate that it would be an unwise policy to abstain from doing so much after having completed the most expensive part of the irrigation system, *viz.*, the weirs over the rivers, the head sluices, and the works for disposing of cross-drainage.

15. In paragraph 4 it has been stated that 311,850 acres are still irrigable from the existing canals, if there were only distributaries for them. Estimates amounting to Rs. 9,32,291, and providing for the irrigation of 103,700 of these acres, have already been submitted to Government. The Committee offer no opinion here * as to whether so much money is necessary, or as to whether, if these lines were all made at once, the ryots would be willing to avail themselves directly of the water, but they have no doubt whatever that where the ryots will take the water, and where it only wants distributary channels to convey this water to their fields, it is advisable to complete these channels to meet the demand. To irrigate the remaining 208,150 acres (*viz.*, 311,850 — 103,700) Mr. Walker, the superintending engineer, estimates that the cost will be Rs. 31,22,250, or Rs. 15 per acre, for here the land must all be embanked. Even accepting this high rate, the Committee believe that the expenditure of this capital would rather improve than otherwise the financial position of these irrigation works, and Orissa could then count on 494,000 acres of rice with which to meet a year of famine. But the communications with surrounding districts would in no way be improved. There is no reason to suppose that rice would rise in value, except to the extent due to improved cultivation, and there would still be a heavy annual deficit. In four of the following six projects the improvement of communications is aimed at concurrently with the extension of irrigation, and although Government is more certain of a return for the money spent on supplying irrigation to willing ryots than on making canals for navigation, still, in the case of Orissa, navigation bears an unusual value. It is even possible that by improving communications Government may get a direct return (by means of higher water-rates) even greater than if it confined itself to making distributary channels, and it is certain that the prosperity of Orissa would be largely increased by the construction of navigation canals.

16. The following statement shows what remains in order to finish the system of canals from the Mahanuddy, Brahmini, and Baiturni rivers in the Cuttack and Balasore districts. As no definite projects have yet been framed either for irrigation or navigation canals in the southern district, Pooree, no allusion will be made to it in this report.

| No. | Name of Work. | Length in Miles. Open. | Remaining. | Total. | Area irrigable from these canals. | Estimated cost, including indirect charges. | Estimated cost of distributaries. | Total estimated cost. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Rs. | Rs. | Rs. |
| 1 | Kendrapára Canal - - - | 39¼ | 14 | 53¼ | — | 5,41,242 | — | |
| 2 | Gobri ditto - - | 15 | 19 | 34 | 54,000 | 7,44,254 | 4,86,000 | |
| 3 | Patamundi ditto - - - | 47 | 3 | 50 | — | | — | |
| 4 | Táldanda ditto - - - | 27½ | 24¼ | 51½ | 63,450 | 13,19,309 | 6,27,989 | |
| 5 | Machgaon ditto - - - | 19½ | 20½ | 39¼ | 36,500 | 6,47,522 | 3,87,150 | |
| 6 | High level canal to Balasore - | 63⅓ | 47 | 110⅓ | 150,000 | 31,55,310 | 16,07,430 | |
| | Total - - - | 211¼ | 127¾ | 339 | 303,950 | 64,07,637 | 31,08,569 | 95,16,206 |

| | Rs. |
|---|---|
| To complete then the distributaries of the canals already made there is required (Rs. 9,31,291 + Rs. 31,22,250) - - - - - | 40,53,541 |

and 494,800 acres would then be irrigable.

| | |
|---|---|
| To extend these canals to their intended termini the estimates amount to - - - | 64,07,637 |
| To provide distributaries to these extensions, bringing under irrigation 303,950 acres, the estimate would be about - - - | 31,08,569 |

Making a total further outlay of about a hundred and thirty-six lakhs, and rendering irrigable an area of 798,750 acres.

The above supposes the work to be continued in the manner in which it has been so far executed; but the Committee think that it is well deserving of consideration whether practical efficiency cannot be secured at a much reduced outlay, and in the following remarks this matter will be attended to. Even were funds available, the above outlay would necessarily be spread over many years, and it is proposed now to consider each of the six projects, and to give the opinion of the Committee as to their relative merits and the order in which they should be carried out.

17. Work No. 1, the Kendrapára Canal, is the only one of the six projects sanctioned, and it is now nearly finished. The estimate of Rs. 5,41,242 provided for a navigable extension of 14 miles to Jambu, a place adjacent to the anchorage of False Point, with the view of bringing that port about 21 miles nearer Cuttack. At present boats from False Point have to pass up about 35 miles of creek and river before reaching the tail lock of the canal at Marsaghai. It is hoped that the work will be completed next August, and much benefit is anticipated.

18. No. 2 work, the extension of the Gobri Canal to Hansua, has for its chief object the completion of a really good line of communication between Cuttack and Chandbalii, and it includes at the same time the irrigation of 54,000 acres. The Gobri Canal at present debouches into a creek leading into the Brahmini River, and although communication is maintained, and a Government passenger steamer runs weekly between Chandbalii and Cuttack, still it is only at high tides that any but small boats can ply up this creek, and the navigation cannot be called satisfactory, while this route is many miles longer than it would be with the canal carried on to Hansua.

19. No. 3, the Patamundi Canal, which has been designed for irrigation alone, is nearly finished, although its distributaries have not yet been made, and there is only a small extent of land irrigated by means of temporary arrangements.

* See paragraph 27.

20. No. 4. By the extension of the Táldanda Canal a second line of navigation will be secured between Cuttack and False Point, and a fertile tract of country will be rendered irrigable, the ryots of which are well disposed to use canal water. The tail lock of the canal into the Mahanuddy would be near the town of Bhútmúndi, a well-known depôt for rice, situated about 16 miles above False Point.

21. No. 5. The extension of the Machgaon Canal is for irrigating a tract adjoining and similar to that affected by the Táldanda Canal extension.

22. No. 6. The prolongation to Balasore of the high-level canal from Cuttack is a project that deserves and indeed has received the closest attention. The distance between these two towns is 110 miles along the line of the proposed canal, and 63¼ miles of this canal are already completed, "terminating," as Colonel Haig expresses it, "abortively in a paddy field." The completion of the canal to Balasore would bring irrigation to 150,000 acres of land, regarding which Mr. Ravenshaw, the Commissioner of Orissa, wrote on 7th November 1874:—

"The chances of returns from irrigation are greater on the high-level, I think, than on any other canals, as it runs across country more liable to drought than the lower part of the delta."

This canal forms an important link in the chain of communication between Cuttack and Calcutta, the completion of which "first and before all things" was urged by Colonial Haig in his exhaustive note of 29th May 1873. It was then proposed to carry on the line from Balasore, through Midnapur, to Calcutta; but doubts having risen afterwards as to whether the latter line would be a satisfactory one, the Bengal Government this year resolved in its stead to connect Balasore with Calcutta by a coast canal from the former town to the Hidgeli Tidal Canal.

23. There appears to be no reason why a low-level canal between Balasore and Calcutta should not be linked on to a high-level canal between Balasore and Cuttack. But apparently when the advantages of the coast line north of Balasore were discovered, the question was raised as to whether a similar coast line southward to False Point would not also be preferable. A fresh estimate of the cost of completing the high-level canal was framed by Mr. Vertannes, Executive Engineer, and instead of it amounting to Rs. 31,55,310, as shown in the statement in paragraph 16, it now appeared that the cost would be Rs. 57,06,240. The low-level canal was shewn to cost much less (about 13½ lakhs from Balasore to the Mitai River), and apparently upon this ground the Local Government resolved finally to abandon the High-Level Project.

24. Where a subject has been so carefully weighed by officers of local experience, this committee are bound to exercise great caution in questioning the decision arrived at. And yet they feel it only their duty to urge a reconsideration of the question. They would not attach undue importance to the completion of the magnificent fragment of a canal already constructed for 63¼ miles from Cuttack to Bhadrak. Better that it should remain always a fragment than that good money should be thrown after bad; and although even in Orissa it is important to increase the irrigation by 150,000 acres, they cannot doubt that the Local Government fully considered what they were losing in giving this up. The reason why the committee urge a reconsideration of this subject is that they believe that its financial aspects were not properly presented to Government, and although they have not had an opportunity of seeing Mr. Vertannes' estimate, they are of opinion that the high-level canal might be constructed for less even than Mr. Walker's estimate of Rs. 31,55,310.

25. They can see nowhere in the papers that the possibility was ever contemplated of making anything but a canal of great size, and with practically no current. It was to have a longitudinal slope of 1 inch per mile, a depth of 8 feet, and a bottom width of 88 feet. The wants of the district for years to come, and the requirements of navigation, do not necessitate the construction of such a costly canal. With a bottom width of 60 feet, side slopes 1½ to 1, and a depth of 8 feet, a canal with a fall of 4 inches per mile would irrigate 96,000 acres, and it could be widened afterwards as irrigation spread. The result of these alterations would be to save the cost of a lock, and to reduce the cost of earthwork by about a half.

The estimate, it is believed, provides for passing under the canal by means of aqueducts the whole of the cross-drainage, and this must cost a large sum, as several streams have to be crossed, and they are doubtless liable to considerable floods. The committee do not dispute that this is the most satisfactory way of disposing of drainage; but was the cheaper alternative ever considered, of providing culverts capable of passing under the canal all ordinary floods, and of allowing perhaps two-thirds of the discharge of extraordinary floods to enter the canal, and escape again by waste weirs? By means such as these they believe that the cost of the high-level canal may be very greatly reduced, and it only requires a visit to the Godavari and Kistna deltas to show that the adoption of these expedients is not incompatible with the most satisfactory system of navigation.

The Ellore Canal in the Kistna District has been open for many years. It is 40 miles long, and crosses several large drainage basins. The provision for these crossings is not yet complete even on the design advocated above. The canal when completed is estimated to cost about Rs. 20,000 per mile, and incomplete as it is, it is a most valuable line of navigation. Rates are believed not to be higher in Orissa that in the Kistna District, and yet Mr. Vertannes' estimate for the high-level canal is Rs. 1,21,400 per mile.

26. As an alternative to the completion of the high-level canal, the committee think that an estimate should be framed of the cost of diverting it at Bhadrak, along the left bank of the Sálandi to the Mitai River, a tidal channel with which it is proposed to connect the coast canal. A weir would be required across the Sálandi, and a large tract could thus be irrigated north-east of Bhadrak. This would cost perhaps six lakhs, and indeed, whether the high-level canal is completed or not, this would be a useful connecting link, which must surely be carried out some day.

27. In paragraph 12 it has been stated that the estimated cost of the distributaries still to be made amounts to from Rs. 9 to 15 per acre irrigable. This is a very high rate compared to their cost in other irrigation systems, but it includes items such as flood-banks, which are elsewhere separately provided for. The committee are not in a position to say whether distribution could be effected here on a cheaper scale, although the price of the land taken up by the lines already made seems unusually high, *viz.*, from Rs. 1·951 on the high-level to Rs. 2·695 on the Machgaon Canal per acre irrigable. But what they call in question is the necessity for so great a mileage of distributary channels, especially considering that so large an area as 500 acres is supposed to be watered out of every square mile commanded. At first it was hoped that by bringing water to the ryot's very field he might be induced to take it, and so naturally a great net-work of distributaries and minor channels was made over the country. Mr. Toynbee, B.C.S., Revenue Superintendent of Irrigation, writing on 19th June 1873,* remarks—

"Hitherto Government have, I think, done more in the way of constructing subsidiary channels than was warranted by the state of the irrigation revenue, and it will be better in future to leave ryots to conduct water from the main distributary to their fields by channels of their own construction, wherever such a course is practicable. The experience of the current year, and of that now under review, has shown that the people will, when they really want water, lead it almost any distance of their own accord."

This view commends itself to the judgment of the Committee, and they would hope that the future extension of irrigation may be managed with the aid of fewer subsidiary channels than have been thought necessary hitherto.

28. Weighing the respective merits of the projects that have been enumerated, the Committee would urge, as the first measure, that the distributaries for the existing canals should be completed wherever this can be done without a large outlay on protective embankments, and wherever it is certain that the water will at once be taken. But they would deprecate the construction of a single line without good evidence on this last point.

Next they would urge the importance of having a thoroughly good line of water communication between Cuttack and Chandballi, which from its position and natural advantages gives promise of being ere long a port of consequence. The present line does not meet the requirements of the case. There are one or two possible alternatives† to the proposed extension of the Gobri Canal to Hansua. On the merits of these the

* Revenue Report for the year 1872-73, para. 38.

† *e.g.*, making the Patamundi Canal navigable, or connecting the present terminus of the Gobri Canal with the Brahmini.

information available is insufficient to allow of a definite opinion being formed, but it should be remembered that canal navigation is greatly preferable to that by creeks and rivers, that the addition of several miles to the distance to be traversed is not unimportant, and that irrigation as well as navigation has to be taken into account.

Next in importance to opening out navigation to Chandballi, the Committee would recommend the prosecution of the high-level canal to Balasore, but only on the supposition that it can be constructed very much under even Mr. Walker's estimate of Rs. 31,55,310. They hope they are not going beyond their sphere in suggesting that should this question be re-opened, the officer employed to frame the new estimates should first be sent to see what has actually been done in the Godavari and Kistna deltas.

29. The Committee think it right to call attention to the maintenance charges on the Orissa canals, on which they think some reduction might perhaps be made. The average expenditure per mile of canal was Rs. 577 for the year 1876 77. In the Kistna delta for the same year the expenditure was Rs. 207, and in the Godavari delta still less. There are already 211 miles open, and as the canals come to be extended the rate of maintenance is a matter of importance.

30. The system of canal administration in Orissa differs both from that pursued in Madras and that of Northern India. In Orissa the canal officer has more to do with the irrigation than he has in Madras, and less than he has in the North-West Provinces or Punjab. The task of conveying water to the ryot's field, and of opening and closing irrigation sluices, rests with patrols who are directly under the canal engineers. The measurement of the area irrigated and its assessment rests with an officer termed the revenue superintendent, who acts directly under the orders of the Collector. The canal engineers submit annually tables showing the area of each kind of crop receiving "illicit irrigation," of the number and class of boats plying on the canals, and the tollage levied, of the miscellaneous receipts from plantations, and other canal produce. But they have nothing to do with the levying of any of these charges, nor with the terms on which canal produce, such as trees, grass, &c. is sold. All this devolves on the revenue superintendent.

31. It has been said that the hope is entertained of soon having all the canal water leased for a term of years. This is no doubt a most desirable arrangement. Where leases have not yet been entered into, the present arrangement is for the revenue subordinate (termed the irrigation tahsildar) to find from the ryots of a village the area which they would each like to water, and to send a memorandum to the patrol, who thereon supplies the water. Usually it is found that the ryots wish for a larger area than they have told the tahsildar of, but they are granted water for whatever fields they point out to the patrol, and are assessed at the rate of Rs. 1-8-0 or Re. 1-0-0, according as the irrigation is by flow or lift. Should they afterwards irrigate more fields than they have showed to the patrol, the excess is termed "illicit irrigation," and a double rate is levied. In the meantime, a formal "water indent" is in the course of manufacture between the tahsildar and the ryot, and perhaps months after this reaches the Executive Engineer's office, and is recorded. What the object of this document is, the Committee fail to see.

32. In the last chapter the Committee have expressed their objection to the system of applications for water, and although it is rather in the irrigation of dry crops than of rice that it is of harm, they would prefer to see it abolished here. It has, however, been explained that the system is necessary in Orissa from the constant practice of the ryots repudiating that they have willingly taken water. They say it has escaped from their neighbours' field unasked for by them, or they deny that they have had it at all, and so it has become necessary before supplying them with water to secure from them an application admitting that they want it and will pay for it. Should the five years' lease system become general, the necessity for applications will be limited to new irrigation.

33. There has been some discussion as to whether the irrigation measurements should be made by the canal engineer or by the revenue superintendent, each party claiming that it should be done by him. As things are just now, there is evidently a divided responsibility, and while the Committee cannot agree as to the direction in which improvements should be made,* they are at one in the opinion that while the present system is worked by the present officers, irrigation matters will not go far wrong in Orissa. The difficulties attending irrigation measurements will be very much reduced when the cadastral survey is completed. In this each field is shown in full detail. At present, maps representing about 26,000 acres of irrigation have been made over to the revenue superintendent, and it is hoped that the survey will be finished in 1880.

34. It seems right to call attention to two sources of possible revenue in Orissa to help to cover the great canal deficit, *viz.*, the imposition of an "owners' rate" on the zamindárs (already alluded to in paragraph 12), and an embankment cess on the lands protected from floods.

35. When the canals were partially opened at the end of 1865, and it became evident that the ryot showed no wish for irrigation, it was generally ascribed to the fear that rents on irrigated lands would be raised at the coming settlement of 1867. At the earnest desire of the Irrigation Company, therefore, a proclamation was issued in August 1866—

"That zamindárs and ryots may take water from the canal freely, and without the smallest fear; that by so doing they will not render the lands irrigated directly or indirectly liable on that account to any increased rate of assessment either now or at any future settlement."

Should this proclamation be considered as for ever preventing the imposition on the landholders of any increased assessment commensurate with the benefits their estates undoubtedly receive from irrigation, the alternative would seem to be so to protect the ryot from enhancement of rent as to enable him to afford to pay Government a higher water-rate.

At a conference presided over by His Honour the Lieutenant-Governor in 1874, it was decided that although the people could afford to pay a cess of 8 annas per acre protected from floods, it could not be levied until the expiry of the present settlement in 1897.† The Committee do not know the grounds of this decision, but the subject might be worth reconsideration.

36. The Committee consider there is great room for improvement in the whole system of levying revenue from navigation, and that its development is likely to be checked by the high rates demanded. Up to 1st November this year, the tolls in force were:—On the high-level canal 33 miles, and on the Kendrapára Canal 39 miles, Rs. 1-8 per 100 maunds per mile. This is equivalent to 2·37 pies per ton per mile on the former, and to 2 pies per ton per mile on the latter. The tonnage of the boat is measured by its displacement, so that as even an empty boat draws some water it never escapes a certain payment. From an analysis by the Superintending Engineer, it appears that from this tollage the Government demand would be 22 per cent. of the whole cost of the water transport, including the wages of the crew, the cost of the boat, and the income of the boatman. On 1st November, this rate was ordered to be doubled for the eight months included between 1st November and 1st July, the previous rate holding good for the other four months, during which there is generally sufficient water in the rivers for navigation.

37. In doubling these rates, Government seem to have considered that it was necessary somehow to increase the revenue, and that the best plan would be to keep raising the tollage till the point was reached beyond which an increase would cause a diminution of receipts, and defeat its own ends. The Committee submit that this is not the way either directly to increase the revenue or indirectly to foster boat traffic and open up Orissa. Coming from the less perfect canals of the southern deltas, teeming with life, they have been struck by the absence of boats on these stately canals of Orissa. On the canals of the Godavari delta alone some 2,000 boats ply. On the Orissa canals the number is a little over 300. There, the owner pays Government annually Rs. 2 for each ton burden of his boat. Here, calculating on the average number of trips, he must pay about Rs. 15. There, a passenger with a head-load of baggage, is carried for a rate not exceeding 2 pies per mile. Here, the only line on which there is any considerable passenger traffic, is between Cuttack and Chandballi, where a passenger, with a servant and 40 lbs. of baggage, is carried 92‡ miles

* See Appendix C., containing the views of one of the Committee.

† See note by Colonel Gulliver, R.E., Officiating Chief Engineer for Irrigation Works, Bengal, dated 16th December 1874.

‡ Partly by canal and partly on the Brahmini and Baiturni rivers.

at the rate of 16 pies per mile, or 8 pies per head. He is towed by a Government steamer, and doubtless goes faster than on the southern canals, but his accommodation is inferior, and the very fact of the fare including a servant indicates that the poorer classes of natives are not contemplated among the travellers. It is not surprising, then, that there should be a constant stream of pilgrims on the roads from Balasore and Chandballi to Cuttack, visiting and returning from the temples of Jagarnath.

38. As long as very few Government boats ply, and these boats are always filled, there is no objection to charging the above rates; but from what they have seen and heard, the Committee believe it would pay Government to increase the number of their boats largely, and to reduce the rate in proportion. There is no necessity for employing steam power within the canals. The pace attained by a steamer drawing a train of passenger boats does not exceed 4 miles an hour, including the long stoppages necessary at the locks. Boats for passengers and cargo can be towed or sailed, and keep up a certain pace of two miles an hour, which is generally fast enough for native passengers, and is much cheaper than using steam power. Where steamers are most valuable is in the rivers and tidal creeks, and they should be confined to these. Ultimately, Government would probably find it better to retire altogether from the carrying trade, and to confine itself to charging a toll on private boats; but until private enterprise has been stirred, and in order to show what can be done, a Government boat train would be a benefit to Orissa, and would probably pay its expenses.

39. Instead of measuring boats and requiring the payment of a tollage, trip by trip, it would be better to adopt the system on the southern deltas of registering periodically every private boat, and then levying a tollage, on payment of which the boat would be free to use the canals until the next period of registration. On the Godavari and Kistna deltas, these boat licenses are taken out only once a year. In Orissa, the boats ply so much on the creeks and rivers, that it would probably be necessary to give the option to the boatmen of taking out licenses for short periods.

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## Chapter X.

### *Irrigation Works in Midnapur.*

Canals in this district, as in Orissa, were undertaken by the East Indian Irrigation and Canal Company, and an important part of their scheme was to connect Midnapur with Calcutta, from which it is 72 miles distant.

There had been an old tidal canal, 12 miles long, from a village on the Hooghly named Ulaberiah, 18 miles below Calcutta, to the Damoodur River, which was supplied with locks, and generally improved by the Company. A new cut, 4 miles long, to avoid a long detour of river navigation, was made to connect the Damoodur with the important River Roopnarayan, and this has just been provided with locks. Navigation was thus brought within 37 miles of Midnapur. To span this distance, and at the same time to irrigate the adjoining land, a weir was built across the Kánsái river at Midnapur, and a canal 25 miles long, and calculated to carry 885 cubic feet per second, was drawn from its right bank, falling into the same river again at Panchkúra. Here a second weir was built, and a canal was taken from the left bank of the Kánsái flowing a distance of 12 miles to a point in the Roopnarain, 4 miles above the entrance of the canal leading to the Damoodur and Hooghly. The Company began operations in 1862-3. In 1866 the communication was complete between Calcutta and Midnapur. The same year some irrigation was effected below Panchkúra, and in 1869-70 it began in the larger field between that point and Midnapur. The canal works became the property of Government along with those in Orissa on 1st January 1869.

2. The irrigable part of Midnapur does not differ from Cuttack materially in climate; the average rainfall being about the same in both, *viz.*, 55 inches. The Kánsái River, however, has a catchment area of only 2,000 square miles, and forms a source of supply much more uncertain than the Mahanuddy. The total area irrigable is only 148,600 acres, of which 118,350 are above Panchkúra, and from the uncertainty of the river supply until the monsoon is well assured it is doubtful whether this area could ever all be watered in those seasons of drought when irrigation is most highly prized.

It has hitherto been the custom of the ryots to abstain from taking water until the last moment, and then to demand it simultaneously, when, even if rain should have fallen in the catchment basin and there should be enough water in the river to fill the canal, every field cannot get its share in proper time, and so disappointment follows. With the five years' lease system now successfully started, it is to be hoped that ryots will begin to take water whenever it is available, and so, there being no longer a simultaneous pressure, a large increase may be effected in the irrigation, although Major Heywood, the Superintending Engineer, has no expectation with the present water supply of its ever attaining the whole area irrigable.

3. The following table shows the area watered year by year since 1869-70, and it cannot be considered at all an encouraging record:—

| Year. | Area irrigated Acres. | Year. | Area irrigated Acres. |
|---|---|---|---|
| 1869-70 | 10,704 | 1874-75 | 72,318 |
| 1870-71 | 22,671 | 1875-76 | 55,995 |
| 1871-72 | 6,028 | 1876-77 | 32,681 |
| 1872-73 | 13,406 | 1877-78 | 19,819 |
| 1873-74 | 36,349 | | |

In the current year 1878-79, an area of 56,000 acres of irrigation has been taken up on leases of five years, and this might seem to be a hopeful sign; but it is explained that no rain fell in Midnapur until 21st July last, so water was much in demand. The local officers, moreover, do not appear to think that the ryot has yet learned really to appreciate canal water; and while in Orissa they are hopeful that, having got accustomed to irrigation during a five-year lease, the ryot will be willing to enter on another five years, here they think that the renewal of the leases will depend on whether the sixth year is one of heavy rain or drought.

4. The Irrigation Company began here, as in Orissa, by charging Rs. 5 per acre for rice irrigation. This was lowered to Rs. 2-8, which is now the rate where an engagement for only one year is made. The holders of five-year leases pay only Rs. 1-8 per acre. The drought of 1873 brought irrigation into high favour, and it will be noticed that the area watered in 1874-75 was nearly double that of the previous year. The crop began well, but a disastrous cyclone swept over the country, occasioning much damage. The irrigated rice which was furthest advanced suffered most, and the ryot repented that he had rashly engaged to pay for water. Mr. H. L. Harrison, the Collector of Midnapur, writing of the year 1876-77, remarks as follows:

"The somewhat remarkable result of the last five years (including the current year among the five) appears to me conclusively to show that the system of annual leases is totally inapplicable to the circumstances of the irrigable area. A single dry season brought the water into the highest possible favour, while three successive seasons unfavourable to irrigation have entirely neutralised this good effect and made the department as unpopular as can be. The water has proved to be invaluable to the ryot in one year, rendered almost valueless owing to a cyclone in the second, worth something but not much in the third, and totally valueless in the fourth of the years which have terminated. It is not in human nature for a system of this kind to produce content among any but very far-sighted persons."

5. Were it a question of introducing irrigation for the first time into Midnapur, Government would probably have no difficulty in deciding against it. But after reading evidence like this of Mr. Harrison's the question even arises whether it is worth while to continue its maintenance, and whether it would not be better to dismiss the irrigation establishment altogether and let the distributary channels fall into disrepair (so saving the Rs. 25,000 spent annually on their maintenance) and to use the Midnapur canal exclusively for navigation. The answer to this question must depend to a large extent on the further consideration of whether or not in a period of years rice cultivation in Midnapur is benefited by artificial irrigation.

6. This point has been decided in favour of irrigation by a series of most careful and extensive experiments carried on under Mr. J. H. Apjohn, C.E, during the last six years.

The following table contains his abstract of results up to the end of 1877. It will be noticed that the irrigation was of enormous value in 1873, and of little or no

value in 1876, but that on the average the produce of irrigated paddy was 40 and 23 per cent. and of irrigated straw 42 and 23 per cent. in excess of the produce of unirrigated lands under the Midnapur and Panchkúra weirs respectively. Under the Panchkura weir the country is more level than under the Midnapur weir, so that water does not run off the land so fast in the former as in the latter tract, and consequently in dry years the Panchkúra lands can make more of their limited rainfall, and the advantages of artificial irrigation are not so marked there as under the Midnapur weir. The high outturn of unirrigated paddy and straw in Hidgeli, the eastern portion of the Midnapur district, is worthy of note. There the rainfall is 70 inches per annum.

KÁNSÁI DIVISION.

ANALYSIS of the RESULTS of EXPERIMENTS, showing the difference between the crops on irrigated and unirrigated lands.

| Locality. | Years. | Number of experiments. | | Outturn per acre in maunds of 80 tolahs. | | | | Difference in favour of irrigation. | | | | Rainfall. | Area under irrigation. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Irrigated. | | Unirrigated. | | In maunds per acre. | | In percentages. | | | |
| | | Irrigated. | Unirrigated. | Paddy. | Straw. | Paddy. | Straw. | Paddy. | Straw. | Paddy. | Straw. | | |
| Under Midnapur weir. | 1873 - | 46 | 12 | 16·32 | 22·50 | 4·41 | 9·75 | 11·91 | 12·75 | 270 | 130 | 44·61 | 30,657 |
| | 1874 - | 287 | 85 | 12·86 | 42·48 | 11·28 | 32·87 | 1·58 | 9·61 | 14 | 29 | 57·46 | 60,866 |
| | 1875 - | 346 | 126 | 23·00 | 56·25 | 18·00 | 37·50 | 5·00 | 18·75 | 28 | 50 | 58·85 | 47,705 |
| | 1876 - | 185 | 148 | 18·56 | 45·00 | 18·74 | 43·22 | — | — | — | — | 70·88 | 28,724 |
| | 1877 - | 234 | 299 | 18·06 | 39·51 | 10·07 | 20·85 | 7·99 | 18·66 | 79 | 89 | 51·80 | 16,039 |
| | Averages - | — | — | 17·76 | 41·15 | 12·50 | 28·84 | 5·29 | 12·31 | 40* | 42* | 55·19 | Average for 9 years at Midnapur. |
| Under Panchkura weir. | 1875 - | 39 | 39 | 29·00 | 53·00 | 22·60 | 37·00 | 6·40 | 16·00 | 28 | 43 | 64·06 | 5,562 |
| | 1876 - | 26 | 26 | 31·22 | 85·52 | 29·40 | 76·03 | 1·80 | 9·49 | 6 | 12 | 69·09 | 2,774 |
| | 1877 - | 41 | 41 | 21·40 | 39·24 | 14·61 | 31·17 | 7·89 | 8·07 | 54 | 26 | 59·68 | 2,328 |
| | Averages - | — | — | 27·21 | 59·25 | 22·21 | 48·07 | 5·00 | 11·18 | 22 | 23 | 55·80 | Average for 8 years at Panchkúra. |
| Hidgeli. | 1875 - | — | 220 | — | — | 23·00 | 60·00 | — | — | — | — | 69·02 | |
| | 1876 - | — | 361 | — | — | 24·30 | 48·15 | — | — | — | — | 70·02 | |
| | 1877 - | — | 508 | — | — | 20·34 | 36·97 | — | — | — | — | 65·04 | |
| | Averages - | — | — | | — | 22·55 | 48·37 | — | — | — | — | 70·13 | Average for 8 years at Contai. |

* The average difference in percentages is obtained from the average difference in maunds of the irrigated and unirrigated crop; it is not of the mean of the percentages column which gives much too high a result in consequence of the abnormal difference in 1873.

In Hidgeli there is no irrigation, but the country is protected by embankments from floods, and efficiently drained through sluices in the bunds.

7. Except in the year 1876 the advantage of irrigation to the ryot was enough to pay his water-rent and make it worth his while to continue irrigating. But some of the local officers insist that, from his extreme poverty and state of indebtedness, the unfortunate Midnapur peasant reaps but a questionable benefit even from a bumper crop. Be it a good one or a bad one, it is said that all beyond a bare subsistence for a limited time is absorbed by the landlord's rent and the claims of his far more exacting creditor—the village money-lender—in whose toils he is hopelessly entangled, and who charges him at the rate of 39 per cent. per annum. When in addition to this comes the hard-and-fast demand of Government for a water-rate of even so little as Rs. 1-8 per acre, the ryot's difficulties increase, and he is unable to understand that in the long run if he obtains better crops his liabilities may be cleared off.

8. If this picture of the Midnapur peasant be true, State interests are involved for more important than that of Irrigation revenue. The Committee have no means of testing its truth, and they may be allowed here to point out how the singular absence in Bengal of the village system so universal elsewhere in India renders it difficult to arrive at any knowledge of the state of the agricultural community. Notwithstanding the alleged poverty of the ryot and the dense population of the district, it is a remarkable fact that the canal officers find the greatest difficulty in obtaining labour for their works. The well-known Calcutta firm, Messrs. Burn and Company, failed in an earth-work contract within four miles of Midnapur and had to pay forfeit, merely because they could not command labourers, although they offered wages as high as 4 annas a day.

9. The price paid by Government at first for rice land between Midnapur and Panchkúra was Rs. 60 per acre. Now its value is about Rs. 100, which seems to indicate that the zemindárs at least have reaped a profit from irrigation. Perhaps it would be possible to charge them with an owner's water rate.

10. The irrigation works of Midnapur are now completed. The Committee have no original suggestions to make for their improvement, and they do not pretend to look on the prospect as satisfactory. They can only hope that by good management leases for a term of years may be taken for most of the irrigable land. They cannot recommend for the present at least that Government should go to any cost in storing up water to supply the deficiencies of the River Kánsái, even should facilities for storage exist, and on this point there is no direct information.

11. The management of irrigation in Midnapur is much the same as that in Orissa. The control of the water-supply and its distribution to the ryots is in the

hands of the Canal Engineers. The execution of leases, the measurement of the area watered, and the collection of the water-rates, are in the hands of the Deputy Revenue Superintendent, acting under the orders of the Collector. During the irrigating season, from June to November, the patrols are under the orders of the Canal Engineers. For the rest of the year they are under the Revenue Department, and help in measuring up irrigation and collecting the water-rent. Applications for remissions of water-rate on account of damage caused by deficient supply are made to the Deputy Revenue Superintendent as a rule long after the irrigating season is over. This is evidently wrong. After the crops are off the ground it is most difficult to decide whether they have failed or succeeded, and there is no reason why the ryot whose crops have failed should not lodge his complaint, and have his field inspected, while the crop is standing to tell its own tale.

12. The prospects of navigation on the Midnapur canal are much more encouraging than those of irrigation, and this is not surprising in the vicinity of a great city like Calcutta, and among a people accustomed to look on their rivers as their highways.

The exact tonnage carried on the canal is not obtainable, for the printed returns are based on a system of measurement which it appears nearly doubles the true burden of the boats. During the year 1877–78 there appear to have been, however, from 100,000 to 120,000 tons of articles of food carried chiefly towards Calcutta, and this would represent the whole produce of an area much in excess of that irrigable by the canal. In 1876–77 about 11,000 tons of salt passed along the canal, valued at 12½ lakhs of rupees, and since the canal was opened the price of salt in Midnapur has fallen from Rs. 8 to Rs. 7-8 per maund, a very material reduction considering the high Government duty. The traffic in the Midnapur canal has gone on increasing at a rapid rate, and is now more than four times as great as it was eight years ago. This is the more satisfactory, as there has been a succession of failures in the locks, and at present a very important one (at Dainan on the Roopnarayan) is closed to traffic. In a few months it is to be hoped that all these obstacles will be removed, and that there will be steady unbroken communication between Calcutta and Midnapur.

13. In paragraph 36 of the last chapter the Committee have expressed their opinion that the tollage of boats on the Orissa canals is too high, *viz.*, 2·37 pies per gross ton per mile. On the Midnapur canal the tollage per mile is one anna per 100 maunds according to the measurements adopted, that is really nearly 2 annas per 100 maunds or 8·56 pies per ton per mile. With such a high charge as this it is surprising that there should be any traffic at all. But river navigation near Calcutta is very costly compared to what it is elsewhere, or indeed compared to transport on the railways. The usual rate charged by a boatman for conveying 100 maunds from Calcutta to Midnapur is Rs. 15, in addition to which the owner of the goods pays the canal toll Rs. 3, so that he has to pay altogether at the rate of 13·4 pies per ton per mile, *viz.*, 11·2 pies to the boatman and 2·2 pies to Government—a striking difference from the rates in the Godavari and Kistna deltas, where the total charge for carriage by water is about 4 pies per ton per mile, or on the upper waters of the Ganges, where it is usually 1 anna per 100 maunds or 3·27 pies per ton per mile. These charges too compare curiously with those on the East Indian Railway, where the usual freight is 9·07 pies per ton per mile for edible grains, salt, &c., but for distances exceeding 500 miles it is as low as 5·44 pies.

14. The Committee are not prepared to recommend any general reduction in the navigation rates of the Midnapur canal. The circumstances of the district are very different from those of Orissa, and it seems probable that the proximity of the great market of Calcutta admits of a much higher charge than would otherwise be desirable. The canal is of chief importance, in ordinary years, as a communication, and as its cost has been great, it is advisable to obtain as great a revenue as practicable from tolls, provided these are not so high as to prevent the people competing on favourable terms for the supply of Calcutta. In the Godavari the great bulk of the receipts are from irrigation, and the people pay the State chiefly in water-rates for the benefits conferred upon them.

They think, if it could be easily managed however, it would be an improvement to have discriminating rates to allow of the carriage of such commodities as straw, firewood, and perhaps laterite, at a reduced tollage. It might be well also to give the boats the option of being registered and taking out quarterly or yearly licenses, and so save the constant recurrence of measurements of tonnage. At the same time it will be desirable to watch carefully the effect of high tolls on the traffic, for it will be a misfortune to the country if the receipts are derived from a small rather than from a large traffic, supposing the amount of such receipts to be unchanged.

15. The following represented the financial condition of the Midnapur canal on 1st April 1878, and it will be easily understood that no possible extension of irrigation or navigation is likely to make it a paying concern. But the Committee would point out that the maintenance charges are excessively high, *viz.*, Rs. 1,170 per mile of canal and about Rs. 100 per mile of distributary. These charges are more than double those on the Orissa canals to which they have already taken exception as being too high,* and there seems no special reason to account for what they cannot but term extravagant expenditure.

The capital account up to 1st April 1878—

| | Rs. |
|---|---|
| On account of works | 48,61,300 |
| ,, of establishment | 16,58,586 |
| Tools and plants | 3,96,354 |
| Suspense balance | 1,55,561 |
| TOTAL | 70,71,811 |
| Deduct receipts on account of capital account | 20,038 |
| | 70,51,773 |
| Add accumulated interest | 21,37,743 |
| TOTAL CAPITAL | 91,89,516 |

The receipts for the year 1877–78 were—

| | Rs. |
|---|---|
| Water-rent | 53,483 |
| Canal produce | 49 |
| Navigation receipts | 1,06,917 |
| Miscellaneous receipts | 9,644 |
| TOTAL | 1,70,093 |

The cost of maintenance, including, direction, &c., was—

| | Rs. |
|---|---|
| Maintenance of works | 1,41,334 |
| Direction and accounts | 33,006 |
| Revenue establishment | 16,189 |
| Navigation establishment | 7,151 |
| Tools and plant | 6,117 |
| Total | 2,03,797 |

That is, the maintenance charges exceeded the revenue by Rs. 33,704, when in order to pay 4½ per cent. on the above capital a net revenue is required of Rs. 4,13,528.

J. MULLINS, Lieutenant-Colonel, R.E.
E. FORSTER WEBSTER, M.C.S.
C. C. SCOTT MONCRIEFF, Major, R.E.

Calcutta,
Dated 27th December 1878.

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## SUPPLEMENT.

*The Irrigation System of the Soane Canals in Behar*

The River Soane has its source near that of the Nerbudda and of the Mahanuddy in the Central India plateau, and after draining a catchment basin of 23,000 square miles of hills and jungle, it emerges into the plains and flows for about 100 miles northward to its junction with the Ganges, dividing the populous and highly cultivated districts of Patna and Gya on its right bank from Shahabad on its left. During its course through the plains, it is remarkable for its broad, sandy channel, which at places is as much as three miles wide. Its character in this part of its course, is deltaic, —drainage rather turning from it than to it. Like the Mahanuddy, it is subject to great variations of volume, the monsoon floods far exceeding a million of cubic feet and the supply in June falling as low as 620 cubic feet per second.

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* Paragraph 29, Chapter IX.

2. The Soane canals are drawn off the river by a weir 12,500 feet long lately constructed at Dehri, a few miles below the point where it leaves the hills. As originally planned, the project was to embrace on the left bank a system of canals for irrigation and navigation extending as far west as Mirzapur, and on the right bank as far east as Monghyr. But these dimensions have been curtailed, and all that is now contemplated is, on the left bank, two first class canals leading to Arrah and Buxar with numerous distributaries throughout Shahabad, and on the right a similar canal to Patna,—all three perfectly adapted for navigation and connected with the Ganges. Were there water sufficient, these canals might irrigate annually 1,300,000 acres. The Arrah canal approaches completion. Water was rudely supplied from it by cutting its banks in the drought of 1873. Its first year of regular irrigation was 1875-76, and last year it reached 165,358 acres. The Patna canal began to irrigate last year for the first time. The Buxar canal is still under construction, and will, it is hoped, be in full operation next monsoon crop. We have visited only the Arrah canal, so our remarks must be understood as applicable chiefly to it. Having passed along a considerable portion of it and seen some of its distributaries, we would bear witness to the faultless excellence with which the works have been constructed.

3. Although, as noticed, the Soane dwindles to a small stream in May and June like the rivers of Southern India, the demand for irrigation is continuous throughout the year as on the glacier fed canals of the North-West. The great variation of supply matters little to the irrigation systems extending from the Cauvery to the Mahanuddy; for one good crop of rice is as much as is generally looked for, and although there is a second crop it is not of much consequence. On the Soane canals, the chief crop of the year is no doubt the *aghani* rice, which is on the ground between July and November. Before it is cut, water is in demand for the *rabi* crops—wheat, barley, and pease; while year by year a larger area is being grown with sugar-cane, requiring water every month from January to January. It is evident that the people thoroughly appreciate irrigation, and were there water sufficient in April and May a large area would no doubt be devoted to indigo.

4. Colonel Haig, Chief Engineer for Irrigation Works in Bengal, estimates that in an average year a supply not less than 3,000 cubic feet per second may be counted on as late as the end of January, after which the *rabi* crops require no water: were it not for the sugar-cane, irrigation might then cease until the rains begin. But the value of the sugar-cane crop is very great, and it is worth making every effort to ensure it from failure. Last year it had only reached 6,714 acres, and arrangements were not sufficiently matured to allow of even that area being watered throughout the dry months unaided by wells. It may be assumed, however, that after allowing for percolation through the weir, the minimum supply of the canals will rarely fall below 600 cubic feet per second; and although it is difficult to dispose of this volume to the best purpose, and at the same time to maintain navigation in channels adapted for 4,968 cubic feet, still, by restricting sugar-cane irrigation to certain distributaries, by exercising the most rigorous economy in water-supply, and by refusing altogether to allow of indigo irrigation, an area of perhaps 50,000 acres of sugar-cane might be reared; and since Rs. 8 per acre would not be too much to charge as water-rate for this crop, a revenue of Rs. 4,00,000 might be secured. From the inquiries made in Shahabad, we would lay stress on the value of this sugar-cane irrigation. The cultivation of the plant is spreading fast, owing partly to the use of Messrs. Burrows, Thomson, and Mylne's excellent sugar-mill. The rabi crops should be sown in October, and as the rice is not all cut before the end of November, the cultivators are too fully occupied to make it likely that they will ever devote the attention to wheat which it receives in the Punjab and North-Western Provinces. But it is probable that if water is ensured to them, they will yearly increase the area of their sugar-cane. We would not have it supposed, however, that there will be no rabi irrigation, for barley and even pease are being freely watered during this dry season, and as more water is available for wheat than for sugar-cane, and each cubic foot effects twice as much irrigation of wheat as either of sugar-cane or rice, the area watered in the rabi will probably always be large. We have no information as to whether it would be possible to supplement the hot weather supply of the Soane by storage in the hills through which it flows, but it is improbable that this could be done within a reasonable cost.

5. The irrigation system of these canals has been assimilated to that of the North-Western Provinces and Punjab. The entire distribution of the water, the measurement of the irrigation, the assessment of the revenue, in fact, every detail, save the collection of the water-rate, is in the hands of the canal officers. It is true that the Bengal Irrigation Act of 1876 provides (section 91) that every order passed by the canal officer in matters of water-supply and distribution shall be appealable to the collector. But this power is unlikely to be much exercised, and the canal officers must be held entirely responsible for the success of the irrigation.

6. In our inquiries we have turned our direction chiefly to the points in which the system fails, and it is satisfactory to have to report that the machinery works quite as smoothly as is to be expected, considering how recently it has been put in motion. The irrigation system of one province cannot be reproduced in every detail in another, and the points requiring alteration can only be found by experience. The officers of the Soane canals are doing their best to find where the arrangements of the North-Western Provinces and Punjab are inapplicable to Bengal, and in Shahabad they are fortunate enough to have a collector (Mr. Edgar, C.S.I.,) fully as interested as themselves in the problem.

7. At present there are two engineering obstacles which prevent the canal officers from utilising all the water at their disposal. Of these the most important is the absence of escapes to the distributary channels. The irrigation is still intermittent and uncertain. The slope of the country is high, about 3 feet per mile. The canal officer is prevented at times from sending a full supply down a distributary for fear of the water not being all used and escaping at the end into lands, where it does mischief. This point is being attended to. Escapes are under construction, and when the engineers have the water more thoroughly in hand there will be less chance of its doing mischief.

8. The other obstacle is due to the incompleteness of the works. The Arrah canal is taken off the Main Western canal five miles from its head at Dehri. Unfortunately no regulator has been built below its point of departure, so that its supply cannot be raised without raising that of the Main Western; but the latter is only an incomplete fragment, and the water would overflow its banks were its full supply (1,398 cubic feet per second) given to the Arrah. Nor can an earthen bank be thrown across the Main Western below the head of the Arrah canal, for some distributaries are taken off it below this point. The head of the Buxar canal is 11 miles further on; when it is opened the difficulty here complained of will probably disappear, or be transferred to below its head. Should it interfere with the engineer's grasp over the supply of the Buxar canal, measures ought undoubtedly to be taken to remove it, and there should be no difficulty about doing so.

9. The chief administrative difficulties on these canals are—

(*a.*) The system of previous applications for water.
(*b.*) The total absence of any village organisation in Bengal.
(*c.*) The dislike entertained by the people to the canal measurements.
(*d.*) The collection of the water-rates.

To these may be added the difficulty of getting together an establishment of any value, seeing they can have had no previous experience of irrigation, and this has led to the employment of Bengali subordinates, knowing nothing of the Hindi language spoken in Behar. This last difficulty will disappear in time.

10. The chief source of annoyance to the people is the system of applications, the objections to which are as strong here as on the Kurnool canal (see Chapter VIII., paragraph 25, page 26). Here, as there, the ryots complain that before getting water they must apply to a canal officer, often at a distance, and sign papers which they do not understand, and undergo vexatious delays. As though to stereotype this unfortunate system, it has been expressly ordered in the Bengal Irrigation Act, sections 74 and 75. Here it is laid down that "no person "shall be liable to pay any rate or due whatever on "account of water supplied to his land with the permis- "sion of the canal officer, otherwise than on such appli- "cation, nor shall water be supplied otherwise than on "such application." It is believed that this provision was made in the interest of the ryot, and to prevent his being charged for water supplied to him, perhaps, against his

will, or at least unasked for. On due representation, so much of this Act might probably be repealed, for it is a source of annoyance, not of protection, to the ryot. But without resorting to so extreme a measure, it might, perhaps, be legitimate to interpret the law as requiring an application for water to be made, not crop after crop, but once for all until such time as the ryot chose to withdraw it. This would get over the objections to the system. The revenue and canal officers, as well as the native gentlemen we consulted, all dwelt on the drawbacks of this application system, and we earnestly recommend its abolition.

11. The want of the village system existing elsewhere in India is felt in all parts of the canal administration. Water distribution within the village lands cannot be left here, as in Madras, to the villagers. There is no *karnam* or *reldi* to manage affairs. When the measurements come to be made, there is no *patwári* as in the North-West and Punjab with his map and *khusreh* to determine the area and the ownership of the lands. These is no *lumberdar* to collect the revenue. These officers belonging to the village carry weight in it, and are of great assistance in canal administration. Ultimately, canal *patwáris* may grow into existence, who will command respect; at present, they have none.

12. It is partly due to the want of village officers, and partly it may be to the novelty of the thing, that the cultivators look with great dislike on the canal measurements. Hitherto village maps have not existed, and no one knew exactly what was the size of his holding. He generally believed, however, that it was smaller than measurement has proved it to be, and when he has had to pay water-rate by the acre, the discovery of its true size has not been a welcome one. Where the settlement is made for 30 years and where any efforts are made to keep up statistics of agriculture, the village officer and his map are familiar objects. Here the settlement is permanent. No record is kept of cultivation, and the sight of land surveyors suggest to the village mind a new road or railroad or canal, possibly about to deprive him of a piece of his land, and therefore viewed with dislike. Then, too, the canal officers have had the drawback of having to conduct the measurement through an untried staff of surveyors—men on small pay and with large opportunities of receiving bribes. In the canals of the North-West, this bribery no doubt goes on, but there the system having been long in operation the surveyors or *amins* are better known and more under control, while the arrangements for supervision are more perfect. A cadastral survey on a scale of 32 inches to the mile has just been completed for all villages irrigable from the Arrah canal. The maps have hardly yet been brought into use, but when they are the measurements will be much simplified. We understand that for economical reasons this survey is not to be continued, and this is greatly to be regretted, for its value can hardly be over-estimated. Possibly it might be prosecuted in a less expensive manner. The maps for instance might be drawn on half the present scale.

13. The Collector finds great difficulty in collecting the water-rates, and there are large outstanding arrears. In Southern India, where the ryotwari system prevails, or in the North-Western Provinces and Punjab, where the collection of the land revenue is done by a village officer, the machinery is ready made for collecting canal revenue also. In Bengal the zamindar pays in his land revenue himself to the Government treasury, and no arrangements exist for dealing directly with the ryots. By the rules laid down by the Bengal Government for the management of the Soane canals (dated 21st October 1878), a headman is required to be appointed by the applicants for a village channel "known or ascertained " to be a substantial person possessed of property, to " attend to their interests, to receive and carry out the " orders of the canal officers, to distribute the water " among the shareholders in the village channel accord- " ing to their shares, and to collect and pay in to the " Collector or other duly authorised person all water- " rates leviable on the lands watered from the village " channel."

This headman is required to furnish security, and is entitled to receive for the proper performance of his duties no less than 8 per cent. on the water-rates assessed. Neither the Collector nor the canal officers think this arrangement practicable. "Substantial per- " sons possessed of property" and carrying weight in their village will not undertake all that is required of them. Men of a humbler class can be found, but they have no power to coerce the high-caste ryot or to make him pay his water-rate. It is probable that the final solution of the difficulty will be the appointment of canal headmen, not for a channel, but for a village. The canal officer must not expect so much from them as he now does, and irrigation in the North-Western Provinces flourishes quite well without the help of channel headmen. By degrees the headman will command respect, and it will be possible to reduce the very high charge of 8 per cent. on the assessments, since if one man is responsible for the collections of a whole village, his emoluments will be far more than if he has only to collect the water-rates from one channel.

14. The local officers look forward to the removal of many of the present difficulties by the institution of contracts or leases of water to certain defined blocks of land for fixed periods. Provision is made for these leases in the rules quoted in the last paragraph. The present water-rates are Rs. 5 per acre for sugar-cane and Rs. 2–8 per acre for all other crops, *kharif* or *rabi*. Excluding sugar-cane, it is proposed to give leases for three years at the rate of Rs. 2–4 per acre for *rabi* and Rs. 1–8 for *kharif*, provided that the area leased is not less than the whole irrigable area within the block in the case of *kharif*, or half the irrigable area in the case of *rabi* cultivation. "By irrigable area is to be under- " stood, as a general rule, the extent of land for which " water can be supplied at the rate of 80 acres in the " *kharif* and 180 acres in the *rabi* per cubic foot of " available supply."

15. This system will no doubt save a great deal of trouble, and for the next three years may work fairly well, perhaps being worth the considerable loss sustained by Government in reduced revenue. But there are objections to it which, in our opinion, ought not to be overlooked. When some years ago water leases were instituted on the Eastern Jumna canal in the North-Western Provinces, they were based on the principle of continuing to certain village lands the water-supply they had received for a number of years previous, the village paying the mean water rent of these same years less a certain deduction granted by Government. For instance, if a village had for the five previous years irrigated on an average 700 out of its total cultivated area of 1,200 acres, and if its average water rental had been Rs. 2,650, Government engaged for the next three years to continue the water-supply under the same conditions, the distributary running the same number of days a week and the number of irrigation outlets remaining unchanged, and for this water-supply the village promised to pay, perhaps, Rs. 2,300. One great object in this system was to induce economy of water, the villagers being allowed with the water supplied them to irrigate as many acres as ever they could within their area of 1,200 acres. Government yearly measured up the irrigation, not for the sake of assessment, but to keep up its information as to the water duty and the style of crops grown. The system failed, it is believed, chiefly because the contract did not specify the sum to be paid by each of the many small landholders of the 700 acres, and they could not afterwards agree among themselves as to the share to be paid by each. But this is a detail which could probably be easily arranged.

16. The system proposed on the Arrah canal is totally different. The applicants for a lease are to send in a form specifying the numbers and areas of the fields they propose to water. Assuming, for instance, that with a full distributary the outlets to irrigate the block discharge six cubic feet per second, the lease must be executed for an area not less than $6 \times 80 = 480$ acres kharif and $6 \times 180 \div 2 = 540$ acres of rabi. Now the duty is distinctly a high one, and it seems to us likely that for the first few years at least the cultivator will not easily effect 480 acres of rice irrigation (especially if the rains are scant) with six cubic feet of water. He will be dissatisfied, and although there will likely be plenty water available in the canal, the canal officer may be unable to give him more than the six cubic feet, because the capacity of the distributary is limited. If the cultivator is a man of any education, he may ask the canal officer to prove that he is really getting six cubic feet, and the latter may not always find it easy to do so, for the volume discharged through a village outlet is not always easily determined. In the *rabi* the cultivator will easily irrigate 540 acres with six cubic feet per second. But he will waste water, and there is no inducement for him to economise it, since if he manages to irrigate 100 more acres he has to pay full rate for them; all the time too the canal patrol and *amin* must keep an eye on his fields, which he dislikes. We would urge that until irrigation is better understood in Shahabad, and until the canal officers understand more

thoroughly the machine they have to work, contracts of this sort be given very sparingly. Where they are given we think the canal officer should be empowered to supply water only on alternate weeks or on a certain number of days a week, especially during rabi irrigation. We also strongly recommend that the areas actually watered should be accurately noted every crop, for with a young canal it is of the utmost importance to know the irrigation that is being effected by its water. We urge this last point, for the local officers did not seem to contemplate keeping such records.

17. Among the difficulties experienced in applying the North-West system on the Arrah canal may be noted the shortness of the *kharif* irrigating season. Although the rice is sown in July, if the rains are copious, irrigation may not begin until October, and in November the crop is cut. There is, therefore, not time enough to have the irrigation measured up and the demand-roll of the villages made out and published before the crop is off the ground, and should there be a dispute as to whether any field had water or not it is not easily determined. The contract system of course gets over this difficulty.

18. Both in the North-Western Provinces and in Southern India the canal officer pays little attention to the channel conveying the water from the Goverment distributary to the field, and provided water is not wasted, little notice is bestowed on it. In the North-Western Provinces a register is kept of all village outlets, but there is no register of channels. When a man applies for an outlet he makes his own channel, and although the canal officer should always advise him and help him in laying it out, and although he will forbid his carrying it across public roads or drainage lines, still it is understood that the cultivators have to make the best arrangement they can for themselves, and a fine is inflicted where water is wasted. On the Arrah canal the officers are much occupied with the village channels, and before water is supplied to a field the channel is inspected and reported on. The outlet occupies a secondary place. The result will be likely that on the Arrah canal the village channels will be better made than in the North-Western Provinces, and decided benefit will accrue, but at first the progress of irrigation will be checked by the canal officers requiring a higher standard than the villager thinks necessary. It is difficult, hardly practicable, to prevent young irrigation from being somewhat sloppy.

19. Rice irrigation was practised in Behar before the construction of the canals by holding up the water in hollows by long low embankments locally termed *aháras*. These exist all along the drainage depressions, but are falling into disrepair as irrigation extends. Still the cultivators try occasionally to fill the pools behind the *aháras* by canal water, and to irrigate with it at their pleasure, evading canal rates by saying it is rain water. At first sight it would appear a good plan to accept these as affording ready made facilities for irrigation which the people are accustomed to. But everywhere in Northern India it has been found that irrigation must sooner or later be accompanied by drainage or the land becomes water-logged; while these embankments last, thorough drainage is impossible. So the canal officers are doing wisely in setting their faces against the use of *aháras*.

20. Magisterial powers under the Bengal Irrigation Act have been conferred on the Executive and Assistant Engineers on the Arrah Canal, and no doubt these officers have thereby attained a certain useful amount of respect in the eyes of the people. The appointment of a native Deputy Magistrate, who is so useful an officer on the canals of the North-Western Provinces and Punjab, would be of benefit here. The value is very great to an Executive Engineer of having beside him an intelligent and educated native thoroughly to be trusted and thoroughly acquainted with irrigation, while he makes himself useful to the irrigating community in many ways, as a referee in disputes, &c.

21. There are very few private boats plying on the Arrah Canal in spite of the costly and perfect arrangements made for navigation. The system of tollage is the same as that pursued on the canals of Orissa and Midnapur, about which the Committee have already expressed an opinion.* A boat is liable to be three times measured in the 58 miles between Arrah and Dehri, and the Government demand for that distance amounts to about 3 pies per ton net of cargo per mile. The general rate paid by traders on this canal is about 9 pies per ton per mile, of which therefore about one-third goes to Government. We are not sanguine that navigation will develope fast on such terms, and we recommend that the tollage be greatly reduced, and that boats be licensed for certain fixed periods. The Patna and Buxar canals radiating from one point, Dehri, reach the Ganges about 80 miles apart. The Arrah canal, starting from the same point, flows between the two, and it seemed questionable to us whether it could ever pay to have made this intermediate line navigable, seeing that it required a total lockage of 160·5 feet and much additional expense in bridging.

* Chapter IX., paragraphs 36 to 39. Chapter X., paragraphs 12 to 14.

22. The following is an abstract of the capital account of the Soane canals as it stood on 1st April 1877. The charge for tools and plant (including the large workshops at Dehri) is very high, and the capitalised abatement of land revenue seems much too small :—

| | Rs. |
|---|---|
| On account of works - - | 1,26,49,691 |
| ,, establishment - - | 31,78,659 |
| ,, tools and plant - | 12,43,827 |
| ,, suspense account - | 4,31,780 |
| Accumulated interest charges - | 27,74,095 |
| Capitalised abatement of land revenue - - - | 16,875 |
| TOTAL - | 2,02,94,927 |
| Deduct receipts on capital account | 1,27,115 |
| Total capital outlay - | 2,01,67,812 |

The works are still incomplete, and Colonel Haig (in a note, dated 6th March 1877), states that the sanctioned estimates, exclusive of interest and other indirect charges, amount to Rs. 2,71,03,615. By the time the whole project is complete, we believe we shall not be above the mark in assuming that the total outlay including accumulated interest, &c., will be 320 lakhs of rupees. Interest on this sum at 4½ per cent. amounts to Rs. 14,40,000, and working expenses, direction, &c., will exceed 6½ lakhs. Altogether to pay 4½ per cent. on the capital there should be a gross revenue of at least 21 lakhs.

Assuming that 4,500 cubic feet per second are available for rice cultivation, 600 cubic feet for sugar-cane, and 2,400 cubic feet for *rabi* crops, and that the water duty is 80 acres per cubic foot for the first and second and 160 acres for the last, we shall have—

| | Acres. |
|---|---|
| 4,500 × 80 = | 360,000 rice. |
| 2,400 × 160 = | 384,000 *rabi* crops. |
| 600 × 80 = | 48,000 sugar-cane. |
| Total area watered | 792,000 |

The existing water-rate, Rs. 2-8 per acre, is very moderate for rice and *rabi* crops, while sugar-cane could, we believe, be rated at Rs. 8. If so, the income from the above area will be Rs. 22,44,000. Navigation and other miscellaneous receipts should swell the revenue to 25 lakhs. So large a revenue cannot be expected for some years to come, but we see no reason to doubt that it will ultimately be obtained, and that the Soane canals will prove a source of direct revenue to Government as well as an inestimable blessing to Behar and a sure safeguard against famine.

E. FORSTER WEBSTER, M.C.S.
C. C. SCOTT MONCRIEFF,
Major, R.E.

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APPENDIX A.

(See Chapter IV—paragraph 8.)

A BILL for the REGULATION and ENFORCEMENT of KHUDIMARAMAT in the PRESIDENCY of MADRAS.

I.—Section 6 of Act I of 1858 is hereby repealed.

II.—The following descriptions of work shall, to the extent hereinafter provided, be performed by Khudimaramat or unpaid village labour :—

(1.)—To fill up gullies, ruts, and holes, and to do all petty repairs of a like nature on *bunds* of tanks, channel banks, or other irrigation works appertaining to the village.

(2.)—To prevent the growth on village irrigation works of prickly pear, wild croton, and other objectionable vegetation.

(3.)—To preserve such bushes and grasses as have been planted for the preservation of the interior water slopes of *bunds* of tanks, and to watch and protect these slopes and the *bunds* generally during the rainy season.

(4.)—To clear silt from tank sluices and channels, and from river and spring channels when not maintained by the State.

(5.)—To clear and regulate *Kalingulahs* (waste weirs with upright stones) and to stop leaks.

(6.)—To construct ring dams in front of breaches, and to strengthen *bunds* of tanks where necessary during the rainy season.

(7.)—To uncover sluices on the requisition of the nspecting officer.

III.—The local Government shall have power to require the performance of any description of work not included in section 2, on satisfactory evidence being adduced of its recognition as Khudimaramat in any district or part of a district, and similarly to declare that in any locality section 2 or any part of it shall not be applicable.

IV.—The quota of labour to be furnished by individuals will be determined by the proportion between the assessment of the lands occupied by them under the irrigation work and the total assessment of the lands under such work. Provided that whenever the ryots are willing to settle among themselves the details of the apportionment of labour, it shall be open to them to do so, the collector being empowered to appoint a *panchayat* for this purpose.

V.—It will be the duty of the headman of the village to fix the quantity of labour or number of labourers required to carry out Khudimaramat work from time to time, and from his orders an appeal shall lie to the collector, whose decision shall be final.

VI.—No one shall be liable to furnish labour for Khudimaramat to an irrigation work under which he does not hold land.

VII.—Whenever an irrigation work supplies the lands of more than one village, the whole of the villages concerned shall be liable to furnish labour for its Khudimaramat as prescribed in section 4. In such cases the shares of work to be done shall be, for tanks and their connected works, settled once for all under the orders of the collector by apportioning to each village a definite length of the tank *bund*, supply channel, distributaries, &c., after which the headman of the village will be responsible that the share of his village is regularly performed. In the case of channels irrigating more than one village, the shares of individual villages shall be as far as possible settled permanently, and so far as such permanent settlement may be impracticable, arrangements shall be made from time to time with the collector's approval.

VIII.—The actual cultivator or tenant of the land where the owner or proprietor of the land is not forthcoming shall be bound to contribute the quota of labour as defined by this Act, and it shall be lawful for such cultivator or tenant to deduct the value of such labour at the current rate of wages in the village from the rent payable to such owner or proprietor.

IX.—The head of each village and the tahsildar of the taluk in which the village is situated shall be responsible for the due performance of Khudimaramat as laid down in this Act.

X.—Whenever the labour required for such purpose is withheld without reasonable cause by the ryot bound to contribute the same, it shall be the duty of the head of the village to cause the immediate execution of the work by hiring such labour at the prevailing rate of wages. The hire shall be paid in the first instance as an advance from the Government treasury under arrangements sanctioned by the collector acting under the orders of the Board of Revenue, and such advance shall be afterwards repaid from the local Khudimaramat fund to be created under this Act.

XI.—It shall be the duty of the head of the village to report his proceedings under the last preceding section to the tahsildar of the taluk, who shall thereupon hold such summary inquiry as he may deem necessary, and adjudge the recusant ryot to pay a penalty not exceeding four times the value of the labour withheld.

XII.—From every decision, act, or order of a tahsildar under this Act, an appeal shall lie to the collector, provided such appeal be made within one month from the date of such decision, act, or order.

XIII.—The decision of the collector on all appeals under the last preceding sections shall be final.

XIV.—Any penalty imposed under this Act shall in case of non-payment be realised in the manner provided for the recovery of arrears of land revenue in the Madras Presidency.

XV.—The head of a village shall be liable to a fine not exceeding Rs. 100, or to dismissal from office, or to both, in case of proved neglect of the duty imposed by section 9 of this Act.

XVI.—All fines and penalties levied under this Act shall be carried to a fund to be called the local Khudimaramat fund, and to be applied to Khudimaramat purposes.

XVII.—When the persons who are bound to furnish labour under this Act prefer to compound for the whole or any part of such obligation by an annual money payment, it shall be lawful for the collector, under the orders of the Board of Revenue, to admit such composition for a period not exceeding three years at such rates as shall be fully equivalent to the labour, and to undertake the execution of the work so compounded for, provided that the whole of the sum so raised shall be spent on the irrigation work in respect of which it is collected.

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## Appendix B.

[See Chapter V—paragraph 19.]

### Revenue Circular No. 18.—Godavari District.

As applications for remission of land and water-tax are often made on the ground of alleged deficiency or excessive supply of water from Government sources of irrigation, and as it is necessary in such cases that the opinion of the Department of Public Works should be obtained as to the truth of the complaints and the best remedies that can be applied, Tahsildars and Deputy Tahsildars in charge of Zamindári Divisions are directed to attend to the following instructions:

1. A list of fields on which demand for remission is made on account of excess or deficiency of water should be prepared by the Karnam as usual, with the number of each field, its extent and assessment; the loss sustained and the reason for such loss as recorded by the Karnam.

2. This list should be carefully examined by the Revenue Inspector to whom it should be sent in duplicate by the Karnam by the 31st October. The former, after noting down his own opinion against each field, will forward it without fail as soon as possible, and never later than the 30th November, to the Tahsildar of the Taluk by a special village servant.

3. The Tahsildar will send on one copy of the lists as soon as he gets them to the Range Officer concerned to enable him to have the fields inspected before the crops are cut.

4. The remarks of the inspecting member of the Public Works Department will be entered on the lists in question, which will be returned to the Tahsildar to be produced at the Jamabandi.

5. It should be understood that the Tahsildars are not hereby relieved of the duty of inspecting the fields themselves, or by their deputies.

6. On the receipt of the opinions of the Department Public Works, the Tahsildar, if he finds that there is any difference of opinion between himself and the inspecting member of the Department Public Works (not being a Range Officer) in regard to the remission of any fields, will at once send extracts from the lists of such fields to the Range Officer.

7. The Range Officer will probably as a general rule inspect such fields himself and return the lists after noting down the result of his inspection to the Tahsildar to be produced at the Jamabandi.

8. With this object in view, Tahsildars are particularly requested to do their best to finish their Azmaish as early as possible in the year, so as to be able to record the result of their inspection before the lists are sent in to the Range Officer. This will enable the Range Officer to inspect the fields, as soon as he finds a difference of opinion between a member of his own Department and the Tahsildar.

9. It is hoped that the Tahsildars will do their utmost to have all fields as to which differences of opinion may arise inspected by the Range Officer before the Jamabandi begins, so as to enable the settling officer to come to a decision at once.

10. These instructions apply to upland as well as to Delta Taluks.

11. The Deputy Tahsildars in charge of Zamindári Divisions who have no Revenue Inspector will themselves examine the fields and send in the lists before the 30th November to the Range Officer.

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## Appendix C.

### Note on the Administration of Canal Irrigation.

It seems to me that, perhaps, the Famine Commission may consider that their Irrigation Committee have not in their report bestowed sufficient attention to the above subject nor laid down, as definitely as they should, where the line ought to be drawn between the duties of the Revenue and the Engineer Officer. I wish to record no dissent from the system as it exists in Madras, partly because it generally works well, and much bitter feeling would be excited if it were altered, and partly because in my short stay in that Presidency, I do not feel that I have mastered the subject sufficiently to recommend decided changes. But I write this note to prevent its being supposed that I so far approve of the Madras system as to wish to see it, or anything like it, introduced in the North-Western Provinces of the Punjab.

2. The Committee have recorded (in chapter III., paragraph 1) how far they consider the Engineer's duties should extend in the distribution of water. The principle there laid down is applicable everywhere; but this principle would lead to a very different conclusion in the conditions of irrigation in Northern and Southern India. In Northern India vastly the larger proportion of the lands irrigated bear what is termed "dry crops," that is, wheat, barley, gram, indigo; and sugarcane may be included in the category. In Madras the one great crop is rice. In Northern India the setting in of the monsoon is the signal for lowering the canal supply; and if the rains are good, the canals may be closed for repairs. In Southern India the irrigation begins with the monsoon showers, and is at its height when the rivers are rolling seaward in full flood.

3. In Northern India the area that may be irrigated always greatly exceeds that for which water is available. The same fields are not watered every year, and the constant task of the canal officer is to economise water and to increase the area of his irrigation. The cold weather crops—wheat, barley, and gram—require only four waterings between October and April, even in dry years, and, when the usual Christmas rains fall, the crop may be matured by two or even one watering. In the hot months of May and June almost the only crops watered are indigo and sugarcane. The water must be supplied every two or three weeks, and that at a season when it is being licked up by the blast of the hot winds, and when a check in the melting of the glaciers may at any time occur (especially on the Jumna Canals), and the volume in the canal may run down.

4. In a dry season in Northern India, the canal officer is mobbed by thirsty ryots imploring him to supply water. He spends his days, sometimes even his nights, in patrolling his distributaries and seeing that the volume at his command is being fairly dealt out. He gets daily reports (at times twice or thrice a day) of the depth of water at points three or four miles apart down his channels. He is always on the watch lest the flow of the water be checked by silt deposit, weeds, tufts of grass, or rubbish, and it is his pride to have clean orderly channels. Nor does his care end with the outlet from the distributary bank; but as he rides through the village lands he keeps an eye on the field channels and advises how they should be laid out so as to secure that as little water as possible should be lost in them. A glance at any Revenue Report of Irrigation in the North-Western Provinces or Punjab will show how much prominence is given to "high water duty," that is, to the area irrigable from a given unit of discharge. The Engineer is held responsible for the water in his canal as he is for the money in his cash-box, and every year a more rigorous account is required of it.

5. The system pursued on the Godavari and Kistna Canals is the one which can be easiest compared with that of Northern India, and they have this point of resemblance, that in both the Engineer is responsible for the water distribution. But here the resemblance ceases. As has been said, the irrigation is in the monsoon, and hitherto there has been abundance of water for the irrigable area. The ryot may wish to flood his rice-field a foot deep, and the irrigation officer may know that six inches is enough and dole it out accordingly. But, generally speaking, when the outlet has been granted to supply water to a certain area, the water flows uninterruptedly throughout the season, and, if one ryot gets twice as much as another, both get enough and they are tolerably contented. Distribution like this is rough indeed compared to that in a North India canal, where a two-inch flooding may save the crop, and an inch and a half may lose it, and where the ryot has only a chance of water at all three or four days in the fortnight. The Madras Canal Engineer then needs to bestow little attention on water duty. Nor does he care much if the distributary channel is untidy and wasteful of water. There is plenty more to draw from.

6. In Madras the Collector directs the canal officer to irrigate a certain area in a certain village. If he can, he complies, and has no more to do with the matter. The irrigation is measured up at the jamabandi season; but as the wet area is usually the same year after year this measurement need not be done with elaborate accuracy. In due course, the Collector reports to the Board of Revenue the area irrigated, and they pass it on to Government in the Irrigation Department. Ultimately, it gets to the Executive Engineer, but he only knows the acreage in each village, and has no accurate information as to whether the improvements he may have made in any of his distributaries have been crowned with success.

7. I do not for a moment urge that a Collector has no more reason to exercise a control over a State canal than over a State railway in his district. He is the principal Government official, the highest revenue officer, and, if a system be proposed for depriving him of the control of a large portion of the revenue, the proof of its expediency lies with its proposer. But what I would urge is that the irrigation of dry crops with a limited supply of water is a scientific process, that to commit it to any chance Deputy Collector or Tahsildar would ensure its failure, and that its success can only be ensured by keeping the distributary channels in a high state of repair, which requires the personal inspection of the Engineer. If these premises be granted, and it be thought right to entrust the water distribution to the Engineer in the way I have described, it is contrary to all human nature to suppose that he will take as enthusiastic an interest in the spread of irrigation as if he is made responsible for the whole affair. If the ryot is to take his complaints not to him but to the Collector, how will the Engineer ever learn his wants? If he only hears months after what has been the result of his delicate water distribution, and then only imperfectly, what encouragement will he have to improve? I go a step further and say that, deprived of the control of his irrigation, the interest of the Engineer will cease when the canal and its branches are completed. And the officer who goes on after that regardless of how the water is being bestowed, and devoting his time to silt and jungle clearances and to the repairs of bridges and culverts, will merit a place among Engineers certainly no higher than the much-despised white-washer of barracks.

8. But it may be said this enthusiasm may be bought too dear. (I confidently appeal to anyone conversant with our canal system in the North-Western Provinces and its officers to say whether it does not exist.) It may be urged that the Engineer knows little of revenue matters, and that the interests of the people, and therefore of the Government, would be better cared for if, after the canal and its branches were completed, a small staff of mediocre engineers were employed merely to keep the works in repair and to see that water was conveyed where required, while all the details of the irrigation and its revenue management were administered by revenue officers. Now to this there are many practical objections.

9. Supposing there were a regular staff of irrigation revenue officers selected from the Covenanted Civil Service as settlement officers have been, and getting promotion in their own line: it would be inexpedient to attach one to each district, partly because there would not be work sufficient for him, and partly because canals and their subsidiary channels must be laid out according to the natural features of the country, and one distributary channel may intersect two or even three districts, while it is necessary that the same officer should have control over it from end to end. These officers would therefore be required either to work under the superior canal officer, which would probably be most unpopular

among them, or under the Commissioner of the division. If they were to be paid as much as their contemporaries in other lines, either the canal establishment charges would be enhanced by the employment of men of some standing, or junior officers would have to be employed, knowing little about irrigation and requiring closer supervision than a Commissioner could bestow.

10. The Revenue Canal Superintendents might, however, be Deputy Collectors—Europeans or Natives, drawing salaries, say, not exceeding Rs. 500 per mensem. They would for the most part be elderly tried subordinates, and might be under the Commissioner or the Superintending Engineer. Now a full canal division consists of about 60 to 120 miles of canal with 500 to 600 miles of distributary channel, and about 200,000 acres of irrigation extended over an area of about 100 miles long by 15 miles wide. It may be managed by an Executive Engineer and three sub-divisional officers, besides a native Deputy Magistrate (a most useful functionary serving under the Executive Engineer), and their joint salaries may be about Rs. 2,000 per mensem or Rs. ·12 per acre irrigated.* Supposing that, relieved of their revenue duties, the Executive Engineer could manage a division one-third larger with two Assistant Engineers and the Revenue Superintendent, instead of the present Deputy Magistrate. The joint salaries would be about Rs. 1,700 or Rs. ·076 per acre irrigated. No doubt, an economy would be effected; but would the Revenue Superintendent be able to supervise irrigation spread over 1,800 square miles, and would the works be maintained efficiently if each sub-divisional officer had charge of 350 to 400 miles of distributary channel? If not, the Irrigation division must be smaller and little or no economy be effected; while surely there is better chance of success if 400 miles of distributaries and their irrigation be under two officers, each responsible for every detail in his charge of 200 miles, than if one has to supervise the maintenance and the other the irrigation of the whole length. A consideration of the distances to be traversed will show this.

11. Nor is it a very difficult thing for a Canal Engineer to acquire a sufficient knowledge of revenue matters. Surely, an educated English gentleman is not disqualified for such information because he is an Engineer? Of course it is distasteful and uninteresting to some, and they should never be employed on running canals; but hitherto there has been no difficulty in finding officers very fond of the work and ready to pass the simple revenue examination now required of them in the North-Western Provinces. They would pass a harder one if required. No doubt there may be a difficulty in procuring qualified Engineers where there are not many Irrigation appointments, and where an officer may be employed one day on a running canal, and the next on a hill road. Fortunately, on the Irrigation systems of Northern India this difficulty need never occur, as the Irrigation officers form a large separate establishment, and rise by promotion only in their own line.

12. As said above, canals and their distributaries in Northern India must follow the natural features of the country, and so cannot be conterminous with the boundaries of districts. Some executive divisions spread over three even four districts, and for this reason, if for no other, the Canal Engineer could not be placed under the orders of the Collector. But if this difficulty were overcome (as it would be if the districts were as large as those of Madras) any subordination of this sort would be most distasteful to the Engineer. They are equals in rank and often in education, while the difference in their years is not great. At present they meet as equals, and, with rare exceptions, each helps the other as becomes officers loyally serving the same Government. Were one placed over the other, friction would inevitably occur, and some of the best Engineers would try to serve in other branches of the Public Works Department.

13. While defending the existing system of canal administration in Northern India, I am far from wishing to see it stereotyped, and I trust that before many years have passed many improvements will have been effected, and that the canal management will be less costly to the State and more acceptable to the people. I look forward with great hopes to the extension of the system of giving irrigation to villages by contract for a term of years. I do not even despair of seeing self-help sufficient to enable a cluster of villages among them to take a contract for the whole supply of a small distributary channel, as the Spanish peasants have done since the days of the Moors. A more accurate system of recording village statistics may enable us to dispense with separate measurements of canal irrigation. These and many other improvements may be hoped for, but I do not think they will be furthered by taking from the canal officers the entire control of the irrigation on which they set such value.

14. The system pursued in Orissa and Midnapur has been described in Chapters IX. and X. In Midnapur the Deputy Revenue Superintendent is an elderly native Government official, much of the class of the native Deputy Magistrates of the North-Western Provinces canals. I have no reason to suppose that he does not do his work well, but his pay is a heavy charge against the small field of irrigation, and, I believe, the Assistant Engineer who must be retained there anyhow would do it equally well in addition to his other duties. In Orissa the Deputy Revenue Superintendent, Mr. Wylly, is a young uncovenanted officer receiving a salary of Rs. 300 per mensem. All agree that he has rendered excellent service, but if he gets the promotion, he has a right to look forward to, he will not be contented to stop where he is. I should be sorry as things are at present to see any change introduced in Orissa which would necessitate Mr. Wylly's transfer elsewhere. But I think the work would be done more efficiently and with less friction if he were placed under the Superintending Engineer and were in the habit of looking for orders and for advice to an experienced officer whose whole thoughts are devoted to the advancement of irrigation rather than to a Collector who cannot possibly have much time to give to the subject, and who probably has never served in an irrigated district before. In our short stay in Cuttack, a case was brought incidentally to the notice of Mr. Walker, the Superintending Engineer, where a large area had been erroneously assessed at the lower rate for lift-irrigation instead of the higher rate for flush-irrigation. This error could not well have occurred if Mr. Wylly had been under Mr. Walker, and if the Executive and Assistant Engineers had all shared in the responsibility of the measurements.

15. In Midnapur and Orissa, as if to show that Government distrust the Engineers having any sort of revenue charge, the sale of grass, timber, fruit, &c., on the canal banks, and the lease of the land belonging to the canal is all managed by the Deputy Revenue Superintendent without reference to the Canal Engineers. This is a source of irritation. The Engineer who looks after his canal banks likes to dispose of their produce, and if he can be entrusted with the control of the water-supply, he surely might be entrusted here. In Madras as well as in Northern India the Engineer has the disposal of all canal produce.

16. While generally concurring with the irrigation system of Madras, there are parts of it which, in my opinion, might be improved. The best chance for the Kurnool Canal would be, I think, for Government to buy out the Irrigation Company and to introduce the system of Northern India. But this would infer the hearty co-operation of the revenue officers with the Engineer, and as the system is so foreign to all Madras custom, this might not be easily secured.

17. At present there is in Madras a Chief Engineer over the roads and buildings, and another over irrigation works. Beyond this, there is no Irrigation Department, and the Superintending and Executive Engineers have charge of all the works within their circles, whether they be canals or kutcherries, roads, or tanks, taking their orders from both the Chief Engineers. Theoretically, the system is a bad one that makes a man serve two masters. But although I saw instances where inconvenience arose, I believe, as I was generally assured, that it practically works well. Where the irrigation is effected by tanks scattered over the country, as in Salem or North Arcot, to maintain a separate staff of Irrigation officers would probably be too expensive, and the officers in charge of the roads may as well retain charge of the tanks. But in the deltas of the Godavari, Kistna, and Cauvery, in the irrigation of the Tamrapúrni, and perhaps in some of the more important systems of tanks connected with rivers, I think it would be an improvement to have officers with nothing but irrigation to attend to, and it would be in keeping with the spirit of the age, for it is the tendency of the

* Canal officers in charge of irrigation are required to pass an examination in the Code of Criminal Procedure, and on their knowledge of the Northern India Canal Act, and the circulars on it. They are then invested with the powers of Magistrates of the 2nd class for the trial of offenders against the Canal Act, and in their magisterial functions they are subordinate to the Magistrate of the District in which the case is tried. But practically, they do not try many cases, but make them over to the native Deputy Magistrate.

Engineer's profession to split up into separate branches, and for the Engineer to select and adhere to one throughout his career. I have been told that in the Godavari and Kistna districts the Engineers would oppose the charge of the roads and buildings being removed from them. There irrigation is the one predominant subject. If it is expedient for the Canal Engineer to look after all the works, then it would be better to place them all alike under the Chief Engineer for Irrigation. But these districts are not all irrigated. I do not know if the roads and buildings away from the canals get the attention they deserve, but I should doubt it.

18. A Superintending Engineer should be exclusively employed in the irrigation of the two northern deltas, and a second would find ample occupation in charge of the irrigation in Tanjore, Madura, and Tinnevelly. The Madras Government have just reorganized the Public Works Department. Had they seen fit to consult their professional adviser, the Chief Engineer for Irrigation, before settling the details of their new scheme, they would probably not have required the same Superintending Engineer to supervise the canals of the Godavari and Kistna and the far distant roads of Ganjam and Vizagapatam.

19. Collectors might easily be required to furnish the Canal Engineers in the deltas with more prompt and accurate statistics than they now have of the extent and spread of the irrigation. One of the best delta officers told me how glad he would be to obtain full information about the fruits of his labour in water distribution; but generally the complaint was that the Collector did not take much interest in the subject, and considering his multifarious duties, I am not surprised that it is so.

The above are the points on which, I think, the Madras system most capable of being improved, and they do not involve any sweeping changes.

C. C. Scott Moncrieff,
January 1879. Major, R.E.

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No. 709.

From C. A. Elliott., Esq, C.S.I., Secretary to the Famine Commission, to C. Bernard, Esq., C.S.I., Officiating Secretary to the Government of India, Home Department.

Sir, Bombay, the 8th March 1879.

I am desired by the President, Famine Commission, to submit, for the information of the Government of India, 75* copies of the report drawn up by the Committee appointed to visit and examine the irigation works in the Madras Presidency and the Province of Bengal.

In doing this, the Commission have much pleasure in bringing to the notice of the Government of India their high sense of the care and ability with which the Committee have performed the duties entrusted to them.

2. The Commission think it very important that before a final expression of opinion is given by them on the subjects treated of in this report, they should be in possession of the views of the Local Governments on these subjects. I am therefore to request that the Report may be forwarded to the Governments of Madras and Bengal, and that they may be asked to favour the Famine Commission, as early as practicable, with their views on the different points and suggestions contained therein.

The more important of these suggestions may be summarised as follows:—

3. First as to Madras.

In Chapter II., para. 5, it is proposed that legislative power should be taken to enable Government to insist on the Zemindar keeping his irrigation works in order, and on his paying a proper share for the benefits he derives from Government works of any kind. Other comments are made on the results of the existing system of administration in Zemindari which appear to call for special attention.

4. In Chapter III. the Committee recommend (para. 4) that the Engineer officers should have control over the channels which distribute water to more than one village, the authority of village officials being confined to such channels as only supply water to their own village: in para. 5 they desire that the officers of the P. W. D. should be supplied with more complete and earlier knowledge of the areas irrigated: and in para. 6 they express an opinion that some strengthening and redistribution of the Irrigation Establishment is necessary.

5. In Chapter IV. they advise the separation of all tanks into two classes, major and minor, and the re-establishment of the custom of "khudi-maramat," or the contribution of labour by the villagers and persons benefitted in the case of the minor tanks. They have also drawn up a draft Act, the passing of which would, in their opinion, effect this object, and have given the details of the system of management they propose, in order to insure that the repairs may be efficiently carried out.

6. In Chapter V. the Committee discuss in detail certain projects for improving and extending irrigation. They support (para. 2) the scheme for the completion of the Godaveri and Kistna irrigation systems. They recommend (para. 5) the deputation of an officer to survey the upper valley of the Tungabudra in particular, and (para. 8) other river basins as well. They speak favourably (paras. 6, 7, and 10) of the Kistnagiri reservoir in Salem, the Periyar project in Madura, the Rushikulia in Ganjam, and the Sangam in Nellore. They recommend (paras. 15 and 16) certain improvements in the existing channels, especially in Coimbatore and Trichinopoly. In paras. 18, 19, and 20, some minor changes as to administration are adverted to.

7. Chapter VI. dwells on the need of a Canal Act for Madras, and several offences and irrigularities are pointed out which cannot, it appears, be effectually dealt with or corrected until such an Act is passed.

8. Chapter VII. deals with canal navigation, and particularly with that on the Godaveri and Kistna deltas. No alterations of system are recommended here.

With reference, however, to the remark in para. 7 that the boats are licensed to use the deltas of either rivers, it may be observed that the Famine Commission were informed that this is not the case, but that boats licensed to ply on the Godaveri have to pay a separate license on entering the waters of the Kistna system; and that this arrangement was complained of as causing trouble and annoyance.

9. In Chapter VIII. an elaborate account of the history of the Madras Irrigation Company's canal is given; and the recommendations made in pera 21 *et seqq.* as to the removal of obstacles and the measures to be adopted for the better management of the Canal will no doubt receive the careful consideration of the Government of Madras.

The Famine Commission think it desirable at once to state their opinion that the adoption of the scheme set forth in para. 38 seems inexpedient. If, as they understand, the irrigated area of 1878-79 has fallen back to about 14,000 acres, or the area of 1875-76, the presumption of steady increase on which the Committee found their suggestion is seen to be based on insufficient data. And even if this were not so, the peculiar financial relations between the Company and the Government would appear likely to prevent any of the proposals made in the Report being successful. All of these would, as far the Commission can judge, have the fundamental defect of in no way stimulating the Company to economical management, but would hand over to it a sum which there would be every temptation to squander on extravagant establishments, and would release it from all anxiety as to the utilization of the works or spread of irrigation.

10. The latter part of the Report refers to the province of Bengal.

Chapter IX. gives the history of the Orissa Canal, and describes the greatly improved prospects of financial success which now attach to it. In paras. 23 to 26 the Committee bring forward some arguments in favour of the high level canal to Balasore and against the coast line, which they think have not yet been fully placed before the Government of Bengal. They refer in para. 27 to the high rate of the cost of distributaries per irrigable acre, and the large area of such distributaries: in para. 28 to the extension of the distributaries and the line of water communication to Chandballi:

* More will follow.

and in para. 29, to the high cost of maintenance. In para. 34 they refer to the possibility of levying an owner's rate and a rate on land protected from flood. In para, 35 they mention promises made in 1866 which might be held to prevent the imposition of such rates, apparently not having been aware that the Secretary of State gave instructions some time ago that this promise should be formally revoked, to which instructions it is presumed that due effect has been given, so that the people have been informed accordingly. The Committee has likewise apparently not known that the Secretary of State called special attention to the propriety of imposing an owner's rate in Bengal, to guard against Zemindars obtaining, without any corresponding contribution on their part, large increases of rent from the profits of irrigation secured by works constructed and maintained at the public expense. As to navigation rates, they consider (paras. 36—39) that many alterations are needed, and that the rates themselves are too high.

11. Chapter X. deals with the Midnapur canal, and here the Committee have no suggestions to make as to irrigation, except (para. 9) that an owner's rate should be levied: and (para. 15) that the maintenance charges are too high. As regards navigation they recommend, in para. 15, that some small alterations should be made in the rates and the system of taking out licenses.

12. As regards the Soane canal (which is dealt with in the Supplemental Chapter, written after Colonel Mullins, R.E., had left India) the recommendations of the Committee are as follows:—Para. 8 refers to the need of a regulator at the head of the Arrah canal: para. 10, to the inconvenience caused by the system of compulsory applications for water: para. 12 to the need of continuing the Cadastral Survey over all the tracts watered by the Canal: para. 13 to the difficulty about finding suitable persons for the post of "canal" headmen": para. 16 to the working of the contract system and the importance of keeping up a record of land irrigated: paragraph 21 to certain reforms in the system of licensing navigation boats.

In reference to this part of the Report the Commission think it right at once to record their earnest desire that no time should be lost in rendering the records of the irrigation from these canals as complete as possible, as they attach very great importance to the improvement of statistical returns of the agriculture of the country.

13. The Commission in conclusion would suggest that the Report might be sent to the Government of the N. W. Provinces and the Punjab for any comments that it might be thought desirable to make on any of the subjects discussed in the Report, and particularly on Major Moncrieff's Note in Appendix C, which has a general application to those Provinces.

I have the honour to be,
Sir,
Your most obedient servant.
C. A. ELLIOTT,
Secretary to the Famine Commission.

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No. 2190I., dated Lahore, 7th May 1879.

From CAPTAIN J. W. OTTLEY, R.E., Officiating Assistant Secretary to Government, Punjab, to the SECRETARY to the GOVERNMENT of INDIA, Home Department.

I AM desired to acknowledge the receipt of your letter No. 95C., dated 18th March 1879, forwarding a copy of No. 709, dated 8th March 1879, from the Famine Commission, giving cover to a report by a Committee, and asking for any comments thereon which the Government of the Punjab might see fit to offer on the report or on its appendix.

2. In reply, I am desired to forward, for the information of the Famine Commission, a Minute by the Honourable the Lieutenant-Governor, Punjab, in which his views as to the administration of Canal Irrigation are stated.

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[Report of Committee on Irrigation Works.]

The opinion of this Government is asked more especially on Appendix C., which relates to the administration of Canal Irrigation; and as the rest of the Report deals chiefly with local matters in parts of India with which I am unacquainted, I do not think it necessary to give an opinion upon them, as they can best be dealt with by those officers who are entrusted with the administration of the particular tracts, and who are acquainted with the peculiar circumstances of each Province.

The general question raised by Major Scott-Moncrieff in regard to Canal Administration is,—to whom should the allotment of water to villages or lands be entrusted —to the Canal Engineer, or to the Collector, or to a special class of officers?—In this Province this duty is performed by the Executive Engineer, under whom are professional Assistants, Native Deputy Collectors, and other Native subordinates. The lands irrigated in each crop are measured and assessed at differential rates according to the class of crop grown. The measurments are now conducted by the Canal Ameens, and the returns of assessment are, after being made up in the Executive Engineer's Office, sent to the Deputy Commissioner for realisation of the assessment.

The boundaries of fields are not fixed, and may be altered at the pleasure of the owners or cultivators, and it has not yet been found possible to make any apparatus which shall deliver water by measure. It is necessary, therefore, to continue the measurements in order to assess the water rate. No other system is practicable if the full value of the water supplied is to be secured.

So long as measurements are necessary, I do not think it possible to place the management of distribution in other hands than those of the Canal Engineer. The Deputy Commissioner could not undertake the management of such a large business. The Canal Engineers do the work very well, and there is no failure of administration to allege as a reason for change in the present system.

There remains for consideration the establishment subordinate to the Canal officer. Besides the professional Assistants, the Native establishment employed is exactly what would under any system of management be employed in such a work, *viz.*.—

Deputy Collectors.
Zilladars.
Chowkidars.

These officials are controlled by the Canal Engineer and his Assistants as well as they would be by the Deputy Commissioner, and there is no reason to think the establishment could be reduced by any change in the management. The only occasion on which the services of especially trained Revenue officers might be useful is in making the first allotment of water on a new canal.

This operation is very important, as upon it the successful working of the distributaries in a great measure depends. But the proper arrangement of distributaries requires professional knowledge. No Revenue officer could work alone in such a duty.

His office would be to examine the holdings in a village, and to state how much of each holding should be irrigated.

The settlement records supply the information required for this allotment of water, and with the help of the village Patwari and of the villagers themselves the work can be done as it was done by Major Palmer, by an engineer of experience in Canal Administration as well as by a Revenue officer.

It does not seem to be necessary to keep up a special staff of Civil officers merely to perform this operation. The distribution of the water of a new canal occurs seldom. If there is no Canal Engineer of sufficient experience to perform it properly, a Civil officer with settlement experience can be appointed for the special duty, in which he can be associated with the Canal Engineer.

R. E. EGERTON.

The 3rd May, 1879.

No. 111C.-W., dated Naini Tal, the 2nd May 1879.

From J. S. BERESFORD, for Secretary to the Government of the North-Western Provinces, Public Works Department, Irrigation Branch, to the SECRETARY to the GOVERNMENT of the NORTH-WESTERN PROVINCES and OUDH, Revenue Department.

In reply to his No. 770, dated 10th April 1879, states that the Secretary to Government in this Department concurs generally in the tenor of Major Moncrieff's note on administration of Canal Irrigation (Appendix C of Report on Irrigation Works in Madras and Orissa).

2. Colonel Brownlow's opinion on this subject was expressed fully in his answer to No. 21, Chap. IV., of the questions published by the Famine Commission, and he sees no reason now to modify that opinion.

3. It has always appeared to him that the Magistrate and Collector of a district has his hands so full of work already that he really has not time to attend to the technical business of distributing the water from a canal, and the statement made in paragraph 19 of Major Moncrieff's note seems to support this view of the case.

4. In his answer to the question of Famine Commission quoted above, Colonel Brownlow discussed the advisability of transferring the water-distribution to a special additional Civil Establishment, and he is convinced that, unless carried out at a cost considerably in excess of that now incurred, it would result in largely diminished efficiency. Any attempt, promoted by a desire for economy, to leave this important business in the hand of the existing district staff would, on the first occurrence of drought, simply result in a catastrophe.

5. He is therefore in favour of leaving matters as they now are, keeping the strictest watch on the manner in which *all* canal officials discharge their duty, and making alterations whenever facts may show that alterations are required. But to upset the best system of canal administration in India, merely on theoretical considerations, and to check imaginary villanies of a class of men who really do their duty wonderfully well and faithfully, seems to him the reverse of sound management.

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No. 2054 I.

From H. C. LEVINGE, Esq., Joint Secretary to the Government of Bengal. Public Works Department, Irrigation Branch, to C. A. ELLIOTT, Esq., C.S.I., Secretary to the Famine Commission, dated Fort William, the 21st May 1879.

P. W. Department (Irrigation).

SIR,

Referring to No. 93C., dated the 18th March last, from the Officiating Secretary to the Government of India, with which was enclosed copy of extract, paragraphs 10 to 12, of your No. 709 of the 8th idem, to the Secretary to the Government of India, Home Department, together with copy of the Report of the Committee appointed to visit and examine the irrigation works in Madras and Bengal, I am directed to forward a memorandum, in which are embodied the views of His Honour the Lieutenant-Governor of Bengal on the several subjects to which attention has been drawn by the Famine Commission, as well as on some other points not specially mentioned.

2. I am to express the Lieutenant-Governor's regret that the despatch of the report has been unavoidable delayed beyond the date specified in Mr. Bernard's letter.

I have the honour to be,
Sir,
Your most obedient servant,
H. C. LEVINGE,
Joint-Secy. to the Govt. of Bengal,
P. W. Dept., Irrigation Branch.

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MEMORANDUM on the REPORT of the COMMITTEE appointed to VISIT and EXAMINE the IRRIGATION WORKS in BENGAL.

In Chapter IX., on the present condition and future prospects of irrigation works in Orissa, paragraph 2, the Committee describe the rivers which intersect the province, and state that the Mahanuddi, during high floods, discharges 1,570,000 c. ft. per second, while it has been measured as low as 400 c. ft. The latter was an extreme case. It must be remembered that the supply in the river is much more than sufficient for the irrigation of the kharif crop of the whole area commanded by the head works, inclusive of the Pooree district, should that ever be brought under irrigation, and that the rubbee cultivation is of trifling extent.

2. In a foot-note to paragraph 5, the Committee state that it is doubtful "whether all the outlay on flood "embankments is fairly chargeable to irrigation." This remark must have been made under some misapprehension, as irrigation is charged only with the cost of maintenance of any flood embankments that may be thrown up specially for the protection of the canals or distributaries in connexion with them. Up to the end of 1875-76 the irrigation works had been erroneously charged with the cost of keeping up the old Mahratta revetment which protects the city of Cuttack; but since 1876 the cost of repairs to the revetments has been charged to "Ordinary agriculture, for which no revenue "account is kept." The maintenance of the embankments all over the district, except those specified above, has been charged to the same head.

3. In paragraphs 9 and 10, the Committee speak o the cheapness of rice in Orissa, and question whether this may not be partially, at all events, due to inferiority in quality. Colonel Haig, writing on this subject, says— "The low price of paddy in Orissa is certainly owing in "part to inferior quality. Mr. Clarke, who has for some "years been stationed at Chandbali, and is engaged in "exporting rice, told me that generally it is of very "coarse quality, such as would not be looked at in the "Calcutta market, and that he had to send considerable "distances to procure the finer kinds required. But the "main cause is undoubtedly want of communicati[illegible] "An inspection of the figures in the table of prices "paragraph 9 would seem to show that the importance "to Orissa of the existence of the coast canal southwards "to Ganjam, Vizagapatam, and the Godaveri is as great "as that of the connection with the Hooghly." The Lieutenant-Governor is fully alive to the great importance of communications. The plans and estimates for a coast canal to connect Calcutta with the Orissa canal system have been submitted to the Government of India with the Lieutenant-Governor's strong recommendation for early sanction. The tidal creeks and estuaries on the coast of Orissa southwards towards Pooree are being improved and deepened from Provincial and local funds. The Madras Government will now be addressed, explaining all this, and they will be asked whether there is any probability of canal communication being effected between Ganjam and the east coast canal in that Presidency.

4. All that is urged in paragraphs 12 to 22, and 27 to 28 is well known to the Lieutenant-Governor, and the importance of completing the canal and distributaries therefrom fully recognised. In the revised estimates about to be submitted to the Government of India for sanction provision will be made for the following:

I.—Continuation of the Gobri Canal to Hansoa on the Brahmini in order to improve the communication with Chandbali.

II.—Continuation of the Patamoondi Canal to meet the Gobri Canal, the lower reach of which will be supplied from it.

III.—Continuation of the Taldunda Canal to tide water at Paradeep, as an alternative communication from Cuttack to False Point.

IV.—Continuation of the Machgong Canal to tide water. This is an irrigation canal only.

V.—Completion of the distributaries and drainage for the whole area commanded by the above canals.

The distributaries from the 2nd and 3rd ranges of the High Level Canal cannot be included, as investigation has still to be made of the extent to which river embankments will be necessary for the protection of the

country. The cost of these embankments will have to be included in the estimates of the distributaries.

5. In paragraph 27 the Committee refer to the high cost of distribution, and call in question the necessity for the very minute system of distributaries which has hitherto been in vogue. The answer to this is, that without such a system, water would never have been taken. The Collector is not hopeful that the people will go to any expense in making the necessary subsidiary channels. He says—"It is with great difficulty that "we can persuade the ryots to take the water at our "price when we bring it to their fields; how then can "we hope that they will go to much trouble and some "expense to get it?" Mr. Wylly, the Canal Revenue Superintendent, writes even in stronger terms—"My "own experience is that considerable increase of such "channels is absolutely necessary if Government would "desire to see any further material progress made in "artificial irrigation in Orissa, though the existing "distributary channels have been made in great detail, "yet more minor village channels will have to be con-"structed before even the area now returned as irrigable "can be effectively supplied." The Commissioner fears want of combination would prove an insuperable difficulty to the construction of village channels by the people. The Superintending Engineer, on the other hand, points out that on the 2nd and 3rd ranges of the High Level Canal, the people "led the water as much as 6 miles "without any distributary, which shows that they know "something of its value and were able to combine to "allow of its passing from one man's land to another." But it must be noted, in the case mentioned by the Superintending Engineer, that the water was given free, no distributaries having ever been constructed on the 2nd and 3rd ranges of the High Level Canal. After fully considering this subject, the Lieutenant-Governor has decided that, in submitting for sanction to the Government of India the estimates for additional distributaries, provision must be made for the construction, as heretofore, of all the minor channels required to lead the water to the villages. Only the main distributaries will in the first instance be constructed, and every effort will be made to induce the people to make the village channels themselves. Under no circumstances will they be constructed at Government expense, unless distinct promises are given that the water will be taken on lease for 5 years. Hitherto it has been absolutely necessary for Government to do *everything*; but now that irrigation is coming into favour, it is hoped the people will do something to help themselves: perhaps, when the present 5-year leases are renewed, we may be in a position to insist on the maintenance of the village channels being done by the villagers.

6. With reference to the remark made by the Committee in paragraph 28, that they would deprecate the construction of a single line without good evidence of the certainty that the water would be at once taken, the Collector remarks—"I take it our choice lies between "having no new main distributaries at all, and having "them on the system followed in the estimates now before "Government for the Patamondi Canal. And I do not "think it would be possible to obtain evidence that it is "certain the water will be taken at once from each work. "Past experiene shows that ryots do not take all the "water, or any considerable portion of it, immediately "on the completion of a new work; they would certainly "not make any voluntary agreement, before the dis-"tributary was commenced, to use it." The Commissioner, writing on the same subject, says—"Without "saying that distributaries should not be made unless "it is absolutely certain water will be taken, I quite "agree with the Committee that we should not construct "them without good reason for so thinking. The large "area for which 5-year leases have now been taken "gives us fair cause to hope that water will now be "generally welcome. At the same time, if the main "distributaries are to be deferred till we can be certain "that water will be taken as soon as they are ready, I "am afraid the time will not be soon: a wet year or "two after their completion would delay applications, "seasons of the opposite nature would ensure them; "but the nature of the seasons cannot be foreseen. "The minor village channels need not be constructed "till the use of the water from them is assured." This view of the matter commends itself to the Lieutenant-Governor, and accords exactly with the decision he has come to in regard to the construction of the distributaries, as given in the last paragraph.

7. In paragraphs 22 to 26 of the Committee's report, the merits of the continuation of the High Level Canal from Bhuddruck to Balasore in lieu of the projected coast canal are discussed. A separate note on this subject by the Chief Engineer will be found in the Appendix A. The Lieutenant-Governor agrees in the conclusions arrived at in that note, and considers that the excessive cost of the High Level Canal, as compared with the coast line, must finally settle the question in favour of the latter. The immense importance of completing the communications with surrounding districts cannot, in the Lieutenant-Governor's opinion, be overrated, and he is glad to find that this is fully recognised by the Committee,—*vide* paragraph 15 of their report, *et passim*.

Mr. Norman, the Collector of Midnapore, in a memorandum dated the 19th April last, after strongly urging the construction of the Tidal Canal in preference to the High Level, ends by saying—"I still continue to hold "the opinion that, as an Orissa Railway could not be "expected to pay, a navigation canal is imperatively "demanded in the interests of the province, and if we "are to have an efficient and paying canal, it must be "a coast canal, fed with tidal water, and not a High "Level Canal." The present Commissioner of Cuttack, Mr. Smith, says—"The expediency of continuing, or "not continuing, seems to me to be entirely one of "cost. The possible return from the irrigation of "150,000 acres should not, however, be overlooked in "the reckoning. The difference between the estimates "for the two works, as now calculated, is, however, "very serious. It appears very doubtful, in conse-"quence, if it will be possible to effect such reduction "on the High Level Canal scheme as to make it the "preferable one, and unless considerable assurance "can be given of this, without much loss of time, I "would be very reluctant to delay the execution of "this coast line, which can be made at a moderate cost, and will assuredly pay well."

8. In paragraph 29, the Committee draw attention to the high cost of maintenance charges on the Orissa canals, stating that the average cost per mile was Rs. 577 in the year 1876-77, while in the Kistna Delta, for the same year, the expenditure was Rs. 207, and on the Godaveri still less. A statement of this kind is but of little value unless the means are afforded of judging how far the cases are similar; if particulars could be furnished, showing what the actual cost of maintenance was in Madras on the different canals, a better comparison could be made. It would then be possible to say whether the cost of maintainance in Orissa was excessive or not. Major McNeile says—"It appears "that these (Madras) canals are smaller in section, "which of course points to smaller silt clearance, and "if they have more rapid currents, the accumulation of "weeds is probably less." Particulars of cost of maintenance of the Orrissa Canals for 1878-79 are given in the Superintending Engineer's report as follows:—

| | Miles. | Cost of Maintenance. |
|---|---|---|
| | | Rs. |
| High Level Canal - | 33 | 24,394 |
| Kendrapara - | 39 | 35,482 |
| Pattamoondi | 47 | 6,641 |
| Gobri - | 15 | 7,293 |
| Total - | 134 | 73,810 |

Average - 550 per mile.

| | Rs. |
|---|---|
| Masonry - - - | 9,774 |
| Silt clearing - - | 1,753 |
| Dredging - - - | 6,330 |
| Earthwork - - | 4,668 |
| Dressing and turfing - - | 1,335 |
| Weed clearing - - | 29,471 |
| Petty repairs - - - | 4,527 |
| Work establishment - - | 3,482 |
| Beropa weir - - | 9,145 |
| River discharges - - - | 442 |
| Contingencies - - | 2,883 |
| | 73,810 |

"Here it will be seen that the cost of weed clearing has been far the heaviest item, amounting to 40 per cent. of the whole cost. In the Kendrapara Canal alone this item amounting to Rs. 18,361, or Rs. 470 per mile.

"The following shows the annual total under this head since 1875-76 :—

| Year. | High Level Canal. | Kendrapara Canal. | Gobri Canal. | Total. |
|---|---|---|---|---|
| | Rs. | Rs. | Rs. | Rs. |
| 1875-76 - | 811 | 5,765 | — | 6,576 |
| 1876-77 - | 10,957 | 12,505 | — | 23,462 |
| 1877-78 - | 5,360 | 9,361 | — | 14,661 |
| 1878-79 - | 9,653 | 18,361 | 1,457 | 29,471 |
| Total - | 26,721 | 45,992 | 1,457 | 74,170 |

"Here it appears that the cost of weed clearance was only Rs. 6,576 in 1875-76, the year quoted by the Famine Committee in which the total mileage average was Rs. 577, while during the past year, when it amounted Rs. 29,471, the average per mile was only Rs. 550. The deduction is, that other items are being more economically executed on an average, and that it is mainly to some better expedient for getting rid of weeds that we must look for a reduction of the maintenance charges of the main line of canal."

The want of a simple machine for weed clearance is much felt, and it is hoped that something of the sort may shortly be forthcoming. The Lieutenant-Governor is well aware of the necessity of reducing the charges on canal maintenance, and the attention of the Superintending Engineer has more than once been called to the subject.

9. Paragraph 30 to 33 refer to the Orissa revenue system. In the 31st paragraph it is stated that all lands irrigated outside those shown to the patrols are assessed at double or 'illicit irrigation' rates; this is not quite a correct view of the case, double rates are charged only when there is good reason for believing that water was taken for the excess area with intention to defraud. The water indent alluded to by the Committee in the latter part of paragraph 31 is a document furnished to the Canal Officer merely for his information. Without this he has no record of the leases granted.

10. Paragraph 32.—All officers who have been consulted are of opinion that in Orissa at least, whatever the practice may be elsewhere, applications for water are indispensable. In the case of 5-year leases, one application is sufficient for all.

11. The question of divided responsibility is referred to in paragraph 33, and discussed in the Appendix C of the Committee's reports. The Lieutenant-Governor having carefully considered the arguments therein advanced does not feel disposed to make any changes in the canal administration in Orissa, where irrigation has now become so thoroughly popular that the cultivators willingly enter into 5-year leases; any change in the administration, the Lieutenant-Governor thinks, would probably do more harm than good.

12. In paragraphs 34 and 35 allusion is made to two sources of possible revenue in Orissa, viz., the imposition of an "owner's rate" on zemindars, and an embankment cess on lands protected from floods.

13. The question of an "owner's rate" was considered at the time the Bengal Irrigation Bill was brought forward. Mr. (now Sir Steuart) Bayley, when asked for his opinion, said he concurred in the non-imposition "as a matter of expediency, not of principle." And he further said—"Apparently such a rate would be "justified, but I still doubt if it is worth while to intro- "duce it. The zemindar's eye to his own interest, and "to the profit obtained by encouraging applications for "water and water courses, is likely to be of more use to "us than the direct levy of a rate. I presume similar "reasons induced the Government to abstain from any "measure which would affect the power of the zemindars "to enhance their rents in consequence of the increased "productiveness from irrigation; and I think it is on the "whole better that the protection of the ryots from any "such undue enhancements should be left to the regular "action of the courts, than be provided for in an Irriga- "tion Bill."

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"The Orissa Canal tolls are undoubtedly high, reckoned only on the mile of canal; but as the canals are links connecting untaxed river navigation of greater length, the total charge upon the cost of transport is much lighter than the Committee make it appear. For instance, in the line from Cuttack to Chandbali, about 100 miles in length, toll is paid on only 40 miles of canal. In the Godaveri there is no navigation, except on the canals, so that the cases are quite different. The question of raising the tolls was fully discussed, and both the Superintending Engineer and the Commissioner concurred in recommending it; at the same time it was considered to be an experiment, and the effect ordered to be carefully watched. As to the relative amount of traffic on the canals, we must remember—(1) that the length of navigable canal in the Godaveri and Krishna is about three times as great as in Orissa, and (2) that the Godaveri Canals have been in use for from 25 to 30 years, while only one canal in Orissa—the Kendrapara —has been open for ten years; all the rest for shorter periods. I suppose it would not be unfair to assume that the number of boats in use on the Godaveri Canals now is double that it was 10 years after the canals were first opened for traffic. If so, and if the development of traffic has been as rapid in Orissa as in the Godaveri, the number of boats now ought to be $\frac{2,000}{3 \times 2} = 333$, 2,000 being the number said to be now plying on the Godaveri Canals. The actual number now in Orissa is stated by the Committee to be 300. It would seem therefore that the higher tollage on the Orissa Canals has not hitherto had any effect in checking traffic, taking that of the Godaveri canal as a standard. It has further to be borne in mind that the Godaveri district possessed, before the works were commenced, an old and well-

country. The cost of these embankments will have to be included in the estimates of the distributaries.

5. In paragraph 27 the Committee refer to the high cost of distribution, and call in question the necessity for the very minute system of distributaries which has hitherto been in vogue. The answer to this is, that without such a system, water would never have been taken. The Collector is not hopeful that the people will go to any expense in making the necessary subsidiary channels. He says—"It is with great difficulty that "we can persuade the ryots to take the water at our "price when we bring it to their fields; how then can "we hope that they will go to much trouble and some "expense to get it?" Mr. Wylly, the Canal Revenue Superintendent, writes even in stronger terms—"My "own experience is that considerable increase of such "channels is absolutely necessary if Government would "desire to see any further material progress made in "artificial irrigation in Orissa, though the existing "distributary channels have been made in great detail, "yet more minor village channels will have to be con-"structed before even the area now returned as irrigable "can be effectively supplied." The Commissioner fears want of combination would prove an insuperable difficulty to the construction of village channels by the people. The Superintending Engineer, on the other hand, points out that on the 2nd and 3rd ranges of the High Level Canal, the people "led the water as much as 6 miles "without any distributary, which shows that they know "something of its value and were able to combine to "allow of its passing from one man's land to another." But it must be noted, in the case mentioned by the Superintending Engineer, that the water was given free, no distributaries having ever been constructed on the 2nd and 3rd ranges of the High Level Canal. After fully considering this subject, the Lieutenant-Governor has decided that, in submitting for sanction to the Government of India the estimates for additional distributaries, provision must be made for the construction, as heretofore, of all the minor channels required to lead the water to the villages. Only the main distributaries will in the first instance be constructed, and every effort will be made to induce the people to make the village channels themselves. Under no circumstances will they be constructed at Government expense, unless distinct promises are given that the water will be taken on lease for 5 years. Hitherto it has been absolutely necessary for Government to do *everything*; but now that irrigation is coming into favour, it is hoped the people will do something to help themselves: perhaps, when the present 5-year leases are renewed, we may be in a position to insist on the maintenance of the village channels being done by the villagers.

6. With reference to the remark made by the Committee in paragraph 28, that they would deprecate the construction of a single line without good evidence of the certainty that the water would be at once taken, the Collector remarks—"I take it our choice lies between "having no new main distributaries at all, and having "them on the system followed in the estimates now before "Government for the Patamondi Canal. And I do not "think it would be possible to obtain evidence that it is "certain the water will be taken at once from each work. "Past experiene shows that ryots do not take all the "water, or any considerable portion of it, immediately "on the completion of a new work; they would certainly "not make any voluntary agreement, before the dis-"tributary was commenced, to use it." The Commissioner, writing on the same subject, says—"Without "saying that distributaries should not be made unless "it is absolutely certain water will be taken, I quite "agree with the Committee that we should not construct "them without good reason for so thinking. The large "area for which 5-year leases have now been taken "gives us fair cause to hope that water will now be "generally welcome. At the same time, if the main "distributaries are to be deferred till we can be certain "that water will be taken as soon as they are ready, I "am afraid the time will not be soon: a wet year or "two after their completion would delay applications, "seasons of the opposite nature would ensure them; "but the nature of the seasons cannot be foreseen. "The minor village channels need not be constructed "till the use of the water from them is assured." This view of the matter commends itself to the Lieutenant-Governor, and accords exactly with the decision he has come to in regard to the construction of the distributaries, as given in the last paragraph.

7. In paragraphs 22 to 26 of the Committee's report, the merits of the continuation of the High Level Canal from Bhuddruck to Balasore in lieu of the projected coast canal are discussed. A separate note on this subject by the Chief Engineer will be found in the Appendix A. The Lieutenant-Governor agrees in the conclusions arrived at in that note, and considers that the excessive cost of the High Level Canal, as compared with the coast line, must finally settle the question in favour of the latter. The immense importance of completing the communications with surrounding districts cannot, in the Lieutenant-Governor's opinion, be overrated, and he is glad to find that this is fully recognised by the Committee,—*vide* paragraph 15 of their report, *et passim*.

Mr. Norman, the Collector of Midnapore, in a memorandum dated the 19th April last, after strongly urging the construction of the Tidal Canal in preference to the High Level, ends by saying—"I still continue to hold "the opinion that, as an Orissa Railway could not be "expected to pay, a navigation canal is imperatively "demanded in the interests of the province, and if we "are to have an efficient and paying canal, it must be "a coast canal, fed with tidal water, and not a High "Level Canal." The present Commissioner of Cuttack, Mr. Smith, says—"The expediency of continuing, or "not continuing, seems to me to be entirely one of "cost. The possible return from the irrigation of "150,000 acres should not, however, be overlooked in "the reckoning. The difference between the estimates "for the two works, as now calculated, is, however, "very serious. It appears very doubtful, in conse-"quence, if it will be possible to effect such reduction "on the High Level Canal scheme as to make it the "preferable one, and unless considerable assurance "can be given of this, without much loss of time, I "would be very reluctant to delay the execution of "this coast line, which can be made at a moderate cost, and will assuredly pay well."

8. In paragraph 29, the Committee draw attention to the high cost of maintenance charges on the Orissa canals, stating that the average cost per mile was Rs. 577 in the year 1876–77, while in the Kistna Delta, for the same year, the expenditure was Rs. 207, and on the Godaveri still less. A statement of this kind is but of little value unless the means are afforded of judging how far the cases are similar; if particulars could be furnished, showing what the actual cost of maintenance was in Madras on the different canals, a better comparison could be made. It would then be possible to say whether the cost of maintainance in Orissa was excessive or not. Major McNeile says—"It appears "that these (Madras) canals are smaller in section, "which of course points to smaller silt clearance, and "if they have more rapid currents, the accumulation of "weeds is probably less." Particulars of cost of maintenance of the Orrissa Canals for 1878–79 are given in the Superintending Engineer's report as follows:—

| | Miles. | Cost of Maintenance. |
|---|---|---|
| | | Rs. |
| High Level Canal - | 33 | 24,394 |
| Kendrapara - - | 39 | 35,482 |
| Pattamoondi - | 47 | 6,641 |
| Gobri - - | 15 | 7,293 |
| Total - | 134 | 73,810 |
| Average - | 550 per mile. | |

| | Rs. |
|---|---|
| Masonry - - - | 9,774 |
| Silt clearing - - | 1,753 |
| Dredging - - - | 6,330 |
| Earthwork - - | 4,668 |
| Dressing and turfing - - | 1,335 |
| Weed clearing - - | 29,471 |
| Petty repairs - - - | 4,527 |
| Work establishment - - | 3,482 |
| Beropa weir - - | 9,145 |
| River discharges - - | 442 |
| Contingencies - - | 2,883 |
| | 73,810 |

"Here it will be seen that the cost of weed clearing has been far the heaviest item, amounting to 40 per cent. of the whole cost. In the Kendrapara Canal alone this item amounting to Rs. 18,361, or Rs. 470 per mile.

"The following shows the annual total under this head since 1875–76 :—

| Year. | High Level Canal. | Kendrapara Canal. | Gobri Canal. | Total. |
|---|---|---|---|---|
| | Rs. | Rs. | Rs. | Rs. |
| 1875–76 - | 811 | 5,765 | — | 6,576 |
| 1876–77 - | 10,957 | 12,505 | — | 23,462 |
| 1877–78 - | 5,300 | 9,361 | — | 14,661 |
| 1878–79 - | 9,653 | 18,361 | 1,457 | 29,471 |
| Total - | 26,721 | 45,992 | 1,457 | 74,170 |

"Here it appears that the cost of weed clearance was only Rs. 6,576 in 1875–76, the year quoted by the Famine Committee in which the total mileage average was Rs. 577, while during the past year, when it amounted Rs. 29,471, the average per mile was only Rs. 550. The deduction is, that other items are being more economically executed on an average, and that it is mainly to some better expedient for getting rid of weeds that we must look for a reduction of the maintenance charges of the main line of canal."

The want of a simple machine for weed clearance is much felt, and it is hoped that something of the sort may shortly be forthcoming. The Lieutenant-Governor is well aware of the necessity of reducing the charges on canal maintenance, and the attention of the Superintending Engineer has more than once been called to the subject.

9. Paragraph 30 to 33 refer to the Orissa revenue system. In the 31st paragraph it is stated that all lands irrigated outside those shown to the patrols are assessed at double or 'illicit irrigation' rates; this is not quite a correct view of the case, double rates are charged only when there is good reason for believing that water was taken for the excess area with intention to defraud. The water indent alluded to by the Committee in the latter part of paragraph 31 is a document furnished to the Canal Officer merely for his information. Without this he has no record of the leases granted.

10. Paragraph 32.—All officers who have been consulted are of opinion that in Orissa at least, whatever the practice may be elsewhere, applications for water are indispensable. In the case of 5-year leases, one application is sufficient for all.

11. The question of divided responsibility is referred to in paragraph 33, and discussed in the Appendix C of the Committee's reports. The Lieutenant-Governor having carefully considered the arguments therein advanced does not feel disposed to make any changes in the canal administration in Orissa, where irrigation has now become so thoroughly popular that the cultivators willingly enter into 5-year leases; any change in the administration, the Lieutenant-Governor thinks, would probably do more harm than good.

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13. The question of an "owner's rate" was considered at the time the Bengal Irrigation Bill was brought forward. Mr. (now Sir Steuart) Bayley, when asked for his opinion, said he concurred in the non-imposition "as a matter of expediency, not of principle." And he further said "Apparently such a rate would be "justified, but I still doubt if it is worth while to intro- "duce it. The zemindar's eye to his own interest, and "to the profit obtained by encouraging applications for "water and water courses, is likely to be of more use to "us than the direct levy of a rate. I presume similar "reasons induced the Government to abstain from any "measure which would affect the power of the zemindars "to enhance their rents in consequence of the increased "productiveness from irrigation; and I think it is on the "whole better that the protection of the ryots from any "such undue enhancements should be left to the regular "action of the courts, than be provided for in an Irriga- "tion Bill."

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established port, the best and safest on this side of India, with a large and flourishing town, and all the appliances for a large export and import trade. In Orissa, False Point was only first known in the famine year, and has since been slowly coming into use, and that, with every possible disadvantage of site, being surrounded by unhealthy jungles, and with no town within 20 miles of it. The first steamer also did not enter Chandbali until 1871. The inducements to export and import trade on the canals have thus been incomparably greater in the Godaveri district than in Orissa."

17. The tolls on the Kendrapara Canal are two pies per ton per mile from the 1st July to 1st November, and four pies for the rest of the year. The double charge was introduced last November; some comparison can therefore be now made. The following tabular statement gives particulars:—

KENDRAPARAH CANAL.

*Tabular Statement showing the increase or decrease of Traffic and Tollage, as compared with the corresponding months of the previous year.*

| MONTHS. | Number of boats. | Weight of cargo. | Value of cargo. | Tonnage of boats. | Ton mileage. | Tollage. |
|---|---|---|---|---|---|---|
| | No. | Mds. | Rs. | Tons. | Miles. | Rs. |
| September | 146 | −27,313 | −1,62,491 | −1,585 | −39,779 | − 480 |
| October - | 190 | −38,383 | 2,48,215 | −1,617 | 60,874 | − 4 |
| November | −102 | −30,191 | 1,98,402 | − 370 | −10,525 | +2,065 |
| December - | − 44 | −85,751 | −2,53,099 | + 1·67? | + 9,206? | 2,813 |
| January - | 132 | −34,949 | −1,19,783 | − 544 | −13,534 | +1,950 |
| February - | −265 | 65,579 | 2,37,650 | −1,835 | −71,644 | +1,642 |
| March - | −319 | −53,630 | 1,98,048 | −1,507 | −36,804 | +2,893 |

This statement, from which "stores and materials for "irrigation works" are excluded as calculated only to mislead, shows a very great falling off in the traffic during the seven months of the last official year, as compared with the corresponding period of the year before; but it also shows that the falling off commenced in September and October *before* the tolls were doubled. It does not follow, therefore, that the doubling of the tolls has actually affected the traffic; the result, as regards the increase in amount of tollage, is, however, most marked. The diminution in the traffic on the Taldunda and High Level Canals corresponds much with the above. It is quite unnecessary to give the particulars here.

18. The probability is that the demand for grain for the famine in Madras in 1877–78 caused the traffic on the canals in that year to be abnormally large, and this view of the matter seems to be borne out by an examination of the figures in the traffic statements of the Midnapore canal, where considerable falling off is shown, as follows:—

MIDNAPORE CANAL.

*Tabular Statement showing the increase or decrease of Traffic and Tollage, as compared with the corresponding months of the previous year.*

| MONTHS. | Number of boats. | Weight of cargo. | Value of cargo. | Tonnage of boats. | Ton mileage. | Tollage. |
|---|---|---|---|---|---|---|
| | No. | Mds. | Rs. | Tons. | Miles. | Rs. |
| September | 353 | 2,24,383 | 8,83,518 | 14,106 | 189,738 | −3,156 |
| October - | [illegible]131 | −1,95,8[illegible]3 | 5,36,[illegible]96 | −12,589 | −238,861 | −3,064 |
| November | + 114 | 8,326 | +1,16,[illegible]48 | 1,5[illegible]8 | 5[illegible]68 | 615 |
| December - | − 270 | 25,182 | 61,786 | 3,434 | 110,009 | 1,995 |
| January - | 527 | 73,419 | − 57,860 | 6,891 | 191,12 | −3,443 |
| February - | 89 | − 91,586 | 9,14,072 | 7,592 | −197,804 | 3,307 |
| March - | − 2,155 | 2,44,148 | 8,28,044 | −21,196 | 472,476 | 8,402 |

The traffic in the last month was no doubt influenced very much by the failure of the lock at Dainan, where transhipment had to be made; but leaving that out of account, the falling off is very marked, and in this canal there was no increase of tollage.

19. On this subject the Commissioner of Orissa writes:—"There is nothing to show that the increased "tolls have in any way led to materially decreased "traffic, while they have certainly yielded a considerable "increase of income. The principle staple of Orissa is "rice. Traffic has decreased, as it was foreseen it "would at the time the change of rates was made on "account of cessation of the demand for the famine "in southern India. The decrease does not appear to "be materially greater in the canals than it has been "elsewhere. The trade of the Balasore ports, of which "but a little for Chandbali passed through the canals, "has decreased about as much as that of False Point, "which almost entirely passes through them."

20. Extracts from the reports of the Commissioner, Collector, and Superintending Engineer on the subject of tollage and canal navigation are given in the Appendix A 1 and afford much interesting information. The Commissioner is not at present prepared to advise reduction in tolls; but he thinks that half rates might be charged for return empty boats, and that the levy of passenger rates, in addition to tonnage rates, is hard: he would only levy one of the two. The Superintending Engineer is of opinion that it will be best to leave the rates as they are, and that when the tolls fall in July next it will be well to review them. He thinks the rates from October to June might with advantage be reduced somewhat below the present figure. The Collector thinks that the tolls at present are too high "the "enhanced rates terminate on 30th of June, and I think "they should not be renewed."

The Lieutenant-Governor attaches great weight to the opinion of the Commissioner who says in paragraph 16—"At present I do not think there is much chance of "any very large increase (of traffic), and I believe that "a reduction of the rates would decrease our tolls "largely, but would not materially increase our traffic." Sir A. Eden is not prepared, therefore, to make any change in the rates of tollage at present; but the fluctuations of traffic will be carefully watched, and reduction made, if it is clearly shown that trade is suffering in consequence of too high a tollage rate.

22. The Committee's remarks on the passenger traffic by the Government steamer are correct. It was found that the number of first and second class passengers was more than enough to fill the steamer, so that preference has been given to these classes. The third class rate is only one-fifth of the second, or two-fifths, allowing for the servant which a second class passenger is permitted to take with him. Another steamer is being built at Cuttack, and the engines have arrived in Calcutta. The flotilla will be increased so as to accommodate all classes of passengers to the full extent required. The steamer has been running 10 months, during which time she has earned Rs. 7,465 over and above all expenses.

53. In paragraph 39 the substitution of a registration fee for tolls is recommended by the Committee. This has been thought of for all the canals. There is no difficulty about it when the boats ply exclusively in the canals as in the Godaveri district; but when there is much river navigation, as in Bengal and Orissa, the imposition of a registration fee upon all boats would be manifestly unjust, as some seldom resort to the canals at all, while others constantly ply on them. In the Godaveri district the revenue from water rates alone yields a splendid return upon the outlay, and it is really unnecessary to tax navigation. In Orissa the case is very different, and every source of income, not plainly injurious to the development of the district, must be utilised to the utmost.

MIDNAPORE CANAL.

The most noticeable feature in the Midnapore Irrigation Project is that, while distributaries have been provided for about 140,000 acres of land, there is water available in bad years for only 50,000 to 60,000 acres.

2. The works were in fact commenced and carried on by the Irrigation Company with but little knowledge of the water supply in the River Cossye. As the works progressed it became evident that the area which it was originally intended should be irrigated from the Cossye (180,000 acres) could not be watered, and the distributary construction was stopped, when provision had been made for the irrigation of about 140,000 acres.

3. The question is now, what is to be done? Say 60,000 acres can be certainly irrigated, there are still 80,000 acres more for which there is no water in dry years. Are the distributaries for this area to be abandoned, so that the cost of maintenance may be saved, or are they to be kept up? and in the latter case, what prospect is there of any revenue being derived from them? Colonel Haig was of opinion that in *ordinary* years water could be given to about 100,000 acres, and that in consideration of the uncertainty of supply a lower water rate might be charged. The Collector, who was requested to report on this point, considered that not above 60,000 acres could be so supplied as to be charged with a water rate. The question is still under consideration, and will receive due attention. The Lieutenant-Governor is not prepared to give an opinion

in the matter, until all the facts are fully before him. If the larger area is to be irrigated, it will be necessery to widen the first reach of the Midnapore canal, which has never heen cut to full section. It remains to be seen if it is worth while to do this.

4. Regarding the question of tolls on this canal, some interesting particulars will be found in paragraphs 3 to 20 of a report by the Superintending Engineer, South-Western Circle—*vide* Appendix B.

5. The Committee, in paragraph 13 of their report, state, that while the tollage on boats on the Orissa canals is 2·37 pies per gross ton per mile, which in their opinion is too high, on the Midnapore canals it is 8·56 pies,—clearly a clerical error for 6·53 pies. It is not stated from what source the Committee procured their information; but the figures above quoted are quite incorrect; the *average* toll on the Kendrapara canal in Orissa is 3·33 pies per gross ton per mile, while on the Midnapore canal it is 3·26 pies,—*vide* the 5th and 6th paragraphs of Superintending Engineer's report, Appendix B.

6. In paragraph 14 the Committee state that they "are not prepared to recommend any general reduction "in the navigation rates on the Midnapore canal," but "they think, if it could be easily managed, it would be "an improvement to have discriminating rates, to allow "of such commodities as straw, firewood, and perhaps "laterite, at a reduced tollage." The Lieutenant-Governor agrees that a general reduction of tolls is undesirable; there is a steady expansion year by year in the revenue from tolls. which indicates a very satisfactory state of things, as follows :—

| Year. | | Rs. |
|---|---|---|
| 1870-71 | tollage | 13,348 |
| 1871-72 | ,, | 12,759 |
| 1872-73 | ,, | 21,188 |
| 1873-74 | ,, | 35,193 |
| 1874 75 | ,, | 45,606 |
| 1875 76 | ,, | 51,494 |
| 1876 77 | ,, | 67,276 |
| 1877 78 | ,, | 1,07,635 |
| 1878 79 | ,, | 76,090 |

The question of discriminating tolls has already been under discussion, but so many valid objections to the measure have been raised that it has been allowed to drop, for the present at all events.

7. The Committee next suggest a system of licensing or registration, so that recurrence of measurements of tonnage may be saved. This system appears to be hardly applicable to the Midnapore canal, where most of the boats ply for long distances from it in the numerous rivers and creeks with which the country is intersected; no objections, so far as is known, have been made to the frequent measurements of their boats by the people, who are now thoroughly accustomed to them. There seems to the Lieutenant-Governor, therefore, no sufficient reason for altering present arrangements.

8. In paragraph 15 the Committee allude to the high maintenance charges on the Midnapore canal. This has more than once attracted the attention of the Lieutenant-Governor, and formed the subject of communications to the local officers. There are, however, special reasons why the cost of maintenance of the Midnapore canals should be higher than elsewhere, which will be found in the Superintending Engineer's report above quoted, paragraphs 20 to the end. The cost of repairs has been reduced in the last year, and it is hoped further reductions will be possible. The subject is one of great importance, and will not be lost sight of by the Lieutenant-Governor.

## Sone Project.

In paragraph 4 of their report on the irrigation system of the Sone canals in Behar, the Committee state, on the authority of Colonel Haig, that in an average year, a supply of not less than 3,000 cubic feet per second may be counted on (from the Sone) as late as the end of January. Colonel Haig's note, from which this information was probably obtained, was dated July 1873, but from a note by Colonel Gulliver, dated 29th January 1875, submitting the revised estimates of the project, which was forwarded to the Government of India under cover of No. 1391. of the 8th February 1875, it is clearly shown that the *average* supply of water available in the Sone for the irrigation of the rubbee crop is 4,000 cubic feet per second, 3,000 cubic feet being the minimum to which the Sone has ever been known to fall during the rubbee season in very dry years. Taking a duty of 180 acres per cubic foot, 720,000 and 540,000 acres respectively could be watered.

2. In the same paragraph, the Committee discuss the question of irrigation of the sugar-cane crop: they state that the minimum supply in the canals will rarely fall below 600 cubic feet per second, and that, with rigorous economy, an area of perhaps 50,000 acres of sugar-cane might be raised; with a water-rate of Rs. 8 per acre (the present rate is Rs. 5 only), a revenue of Rs. 4,00,000 might thus be secured: and further it is said that *if* water is ensured to the cultivators, they will yearly increase the area of sugar-cane. In this lies the whole gist of the question; unfortunately the supply of the Sone in the dry weather, when water is most wanted for sugar-cane, is extremely precarious. This year, probably one of the driest ever known, the volume in the Sone has already fallen to 500 cubic feet per second, and a further fall must be expected;* moreover, the usual spring rains and showers have failed. Now when the loss by evaporation, in the very hot dry climate of Shahabad, on the large surface of water exposed in the canals is considered, it will be understood that there is not much water available for irrigation. The Lieutenant-Governor is fully alive to the value of the water for the sugar-cane crop; the greatest scope possible has been, and will be, given to its irrigation, and the strictest economy observed in the distribution; water is supplied from certain distributaries only in rotation, and it is rigorously refused unless the village channels are in good order. The irrigation of cheena, indigo, and the hot weather crops has been stopped. In the face of such facts as these, it is very doubtful if a rate of Rs. 8 per acre could be charged, as suggested by the Committee. Rs. 5 is now paid on the understanding that no reduction will usually be made for short supply of water in the hot weather. The question of the sugar-cane rate will not be lost sight of.

3. Regarding the possibility of storing water in the Hills but little is known; the great cost of construction of such works is the principal objection to them.

4. In paragraph 8 the Committee remark on the absence of a regulator at the offtake of the Arrah canal: this is an engineering question. A note by the Chief Engineer on this subject will be found in the appendix C.; the Lieutenant-Governor thinks that there is no immediate necessity to take action in the matter. It is hoped that there will be considerable savings on some of the items of the estimates of the Sone canals, from which any works that may be found to be ultimately necessary for regulating the water-supply of the Arrah canal may be constructed.

5. With reference to paragraph 10, in which the system of previous applications for water is mentioned and condemned, the opinion of the Commissioner of Patna and of the Superintending Engineer of the Sone circle are given in Appendix D. After full consideration of the question, the Lieutenant-Governor is of opinion that it would be premature to repeal sections 74 and 75 of the Bengal Irrigation Act; but the suggestion of the Committee may be accepted, viz., that the law may, at the option of the local officers, be interpreted "as requiring "an application for water to be made, not crop by crop, "but once for all, until such time as the ryots claim to "withdraw it." This will get over the difficulty, partially at all events, until the village channels all over the country are completed and registered. The Commissioner, it will be observed, considers that until this is done the system of previous applications cannot possibly be abolished; subsequently, however, he remarks that for practical purposes they are of little use, for reasons given by the Superintending Engineer; and finally, he states that experience shows that what was specially enacted for the convenience of the people (viz., the provision in the Act for initial applications for water), now proves to be a source of annoyance to them. Ultimately the 74th and 75th sections of the Act may, in the Lieutenant-Governor's opinion, be repealed with advantage.

6. With respect to the system of village officers, noticed in paragraph 11, the question is receiving attention at the hands of the Collector of Shahabad; the selection of a better class of putwarrees and of headmen for the collection of water-rates is in train.

7. In paragraph 12 the extension of the cadastral survey is advocated, in order that the vexatious system of measurements of irrigated lands by the ameens may

* *Note.*—The Chief Engineer attributes this to the fact that there were no floods in the Sone during the last monsoon; the rainfall must therefore have been very small at the sources of the river, consequently the springs, whence only the supply comes, have fallen abnormally low.

be put an end to. The whole of the area under the command of the Arrah and Patna canals has been surveyed, and the maps and khusrahs are gradually coming in from the Revenue Survey department. More than the whole amount provided in the sanctioned estimates of the projects for the cadastral survey has been expended, and the Lieutenant-Governor is of opinion that nothing more should be done, at all events, until it is seen whether the practical advantages of the maps are such as to warrant an additional expenditure of nearly 3½ lakhs of rupees, which is required for the completion of the survey; all the officers of the Revenue and the Irrigation Departments, who have been consulted on this point, have expressed this opinion. The area actually surveyed has been 11,84,000 acres, at a cost up to date, including maps, of Rs. 6,78,545. The estimate sanctioned by the Secretary of State was Rs. 5,44,499. The acreage cost has been Rs. ·57, and there will be required to complete the survey of the remaining area Rs. 3,17,011. The excess over the original estimate, now Rs. 1,34,046, will then be Rs. 4,51,057. Possibly, the whole, or at all events, a considerable portion of this sum may be available from savings on other items of the sanctioned estimates of the project, and it might be well devoted to the cadastral survey; but until the works are more advanced, it is not possible to say what amount may be available. There is, for reasons above given, no necessity to complete the survey at once, and the Lieutenant-Governor is unwilling to ask the Government of India to incur any expenditure which would be likely to cause an excess over the estimates already sanctioned. No savings can be effected in the cost of the survey, and the suggestions regarding the reduction of the scale to which the maps are drawn cannot be carried out; the question was most fully and carefully considered by the officers of the Survey and Irrigation Departments, and it was finally decided by Sir Richard Temple, then Lieutenant-Governor of Bengal, that a smaller scale than that now in use could not be adopted, if the maps were to be of any real use. That the present system of measurements by ameens is vexatious is undoubted. The Commissioner of Patna would wish to see them conducted by the Deputy Collectors appointed for the collection of the water-rates; this would be practically to transfer the measurements from the Canal Officer to the Collector. The Lieutenant-Governor fails to see what advantage would be gained by such an arrangement, as the ameens must in any case be employed. The zillahdars and sub-divisional canal officers of the Irrigation Department make check measurements, and it is not apparent that this work would be equally well done by the Deputy Collectors. In any case it would be impossible to get rid of zillahdars, therefore no saving could be effected by the change. Mr. Walker, the Superintending Engineer, writes as follows:—

"The most practical way to look at the matter is this. What sum of money have we to pay away annually in salaries to measuring ameens, mohurrirs and khalassees, which would probably be saved by having a complete cadastral survey and correct khusrahs? Taking the area under the Arrah canal at 994 square miles, and the rate per survey mile as Rs. 346, the cost of the survey may be taken at Rs. 3,43,924—Rs. 3,43,924 at 4½ per cent. = Rs. 15,475. The estimate just received from the Arrah division for establishments for 1879–80 allows about Rs. 4,000 for salaries of measuring ameens and khalassees, and this will suffice for the work of only 75,000 acres out of 221,000 acres irrigable. When the whole area is under irrigation, probably Rs. 12,000 would be required to effect all the necessary measurements. Looked at in this light, it is well worth while to have the whole irrigable area surveyed; but it must be remembered that under any circumstances a staff of measuring ameens would for three or four years to come be to some extent required."

8. In paragraph 13 the question of appointing headmen is alluded to; the practical difficulty hitherto experienced has been to find men capable of performing the double duty of distribution for the canal officers, and collection of water rates for the Collector. It is now proposed that each department appoint its own headman, and the necessary alteration will be made in the rules. It does not seem possible at present to reduce the charge of (4+4) 8 per cent; ultimately it may be got down to 5 per cent.

9. Paragraphs 14 to 17 treat of the question of the contract or block system of irrigation. On this point the Superintending Engineer remarks as follows:

"Under Rule 20 leases for three years are only open to the public up to the 1st of June of the current year. The concession has been but little taken advantage of. Thus for khureef season of 1878–79, out of a total leased area of 73,033 acres, the area under three-year leases amounted to only 2,222 acres. Similarly for rubbee season 1878–79, out of a total leased area of 48,265 acres, there were only 480 acres under three-year leases. From the canal officer's point of view, the advantage of the three-year lease is, that under it, it is not necessary to have a lot of ameens and other canal subordinates harassing the people (to say nothing of possible fees), and having their own time occupied by constant measurements, requiring the presence of the ryots. But before any real saving in measurements can be effected, the three-year lease system must be altered to a rate on land instead of on crops. At the same time I doubt whether we are yet in possession of sufficient data as to the relative areas under different crops (especially as to the important question of the proportion of khureef and rubbee lands grown with sugar) to enable us to say what average rate per acre for all crops, Government should bind itself for even three years. Again, after the experience of the last three seasons, it is becoming an open question whether Government should *bind* itself to supply any irrigation between the 1st April and 1st July. For many reasons it is most important, as urged by Major Scott Moncrieff, to have an accurate register of the effect of irrigation in extending the areas under certain crops, and diminishing the cultivation of others; but may not such information be purchased too dear? and may not the same end be attained with sufficient accuracy, without the cost attending the maintenance of a regiment of measuring ameens in each division. Could putwari returns of lands under various crops, sent up entirely independent of the application forms and permits, not be relied upon for supplying the required information?"

The Collector of Shahabad, Mr. Edgar, C.S.I., with whom the Commissioner agrees, writes on the subject of measurements of crops for merely statistical purposes:—

"Of course it is very desirable to get correct agricultural statistics; but like all good things they may be purchased too dearly, and if we can get rid of constant measurements for purposes of assessments, I should certainly object to retain them merely for statistics. I do not lay much stress on the cost of these measurements, though this is a consideration which should not be overlooked in the present financial state of the canals. I object much more to them, because they harass and worry the people who have to feed and perhaps fee the ameens."

In these views the Lieutenant-Governor concurs. The question of altering the three-year lease system now in vogue, which will expire in June next, to a system whereby water will be given to well-defined blocks of rice or rubbee lands for fixed sums, and for a period of three or five years, has already been considered by the Lieutenant-Governor, who came to the conclusion that before taking action it would be better to wait for another year. It must be remembered that irrigation has only been introduced into Behar within the last few years, and that constant changes, at short intervals of time, are undesirable and bewildering to the people. When the time comes, this question will be fully considered by the Lieutenant-Governor in all its bearings.

10. Paragraph 18.—Much importance has been attached to the question of village channels on the Sone canals, and efforts have been made to insist on their being kept in good order; it is principally by such means that waste of water can be prevented, and when it is considered that the dimensions of the canals have been calculated for a duty of water, which it is now known can never be attained, it is absolutely necessary to economize the water to the utmost; the remarks regarding the irrigation of the sugarcane crop, in paragraph 2 above, also point to the necessity of economy in water. The Committee evidently are of opinion that too much attention has been paid by the canal officers to the village channels, and that irrigation has at the outset been checked in consequence; but for the reasons given above, Sir A. Eden is confident that the question has been properly dealt with.

11. Paragraph 20 discusses the appointment of a native Deputy Magistrate, who would make himself generally useful. Both the Superintending Engineer and the Commissioner, who have been consulted on the subject, are of opinion that no Deputy Magistrate is required. The Lieutenant-Governor agrees in thinking

it quite unnecessary to make any such appointment, which would only add to the already overburdened cost of establishments.

12. The Committee, in paragraph 21, object to the rate of tolls on the canals as too high, and recommend a system of licensing. There would, the Lieutenant-Governor thinks, be great difficulty in adopting the latter proceedure on the Sone canals, as the boats pass out into the Ganges, and perhaps only make one or two trips up the canals in the year, plying to all parts of the river. When traffic is confined to the canals, and boats ply between two well-defined points, the arrangement is possible. It must be remembered that the Sone canals have only been opened for navigation for a year or two, and that the tollage rates are tentative. The whole cost of carriage, inclusive of tolls, is stated by the Superintending Engineer to be 9 pies per ton per mile, or 2 annas and 1 pies per 100 maunds per mile; the carting rate of the district is 8 annas, or just three times as much. For all articles with which the railway comes into competition, the tollage rate has been reduced one-half: thus the tolls on coal and stone, which can be procured either on the Railway or in the neighbourhood of the canal, are only one pie per ton per mile on the measured maundage of the boats; while grain and all other produce pays 2 pies per ton, the toll on all empty boats in 1 pie per ton. The following remarks are by Mr. Walker, the Superintending Engineer:—

"The following is an abstract of the tollage returns from the three canals open during the year 1877-78 and 1878-79:—

| Year. | Private. | Government stores. | Total. |
|---|---|---|---|
| 1877-78. | Rs. | Rs. | Rs. |
| Arrah canal - - | 7,174 | 5,460 | 12,634 |
| Main western ,, - - | 1,194 | 2,711 | 3,905 |
| Patna ,, - - | 2,777 | 7,084 | 9,861 |
| Total | 11,145 | 15,255 | 26,400 |
| 1878-79. | | | |
| Arrah canal - - | 6,729 | 2,423 | 9,152 |
| Main western ,, - - | 1,008 | 160 | 1,168 |
| Patna ,, - - | 13,762 | 4,911 | 18,673 |
| Total | 21,499 | 7,494 | 28,993 |

"The very noticeable falling-off in the receipts on the Arrah and main western canals during the past official year, as compared with 1877-78, is said to be due to the opening of the Patna canal, which, owing to its being open to the Ganges, now takes the bulk of the traffic. This must, to some extent, be true; but I would point out that by far the largest portion of the falling-off consists of tollage on Government stores, an item from the deficiency of revenue on which no argument can be drawn. The traffic returns from the Patna canal are the best index of the effect of the present scale of tolls on canal navigation, and, on this side at least, it cannot be said the existing toll tariff prevents the development of canal traffic. There is of course a point beyond which it would be impossible to raise the rate of tollage; but whether 2 pie per ton per mile is beyond the limit, I hold we have had far too short experience as yet of the working of the canals, and of the incidence of the tolls, to guide us to correct conclusions. I cannot recommend any material alterations in the tariff until after we have see how traffic is affected by the opening out of the Buxar canal, and not then until fully two years after the outfall lock has been opened."

The Lieutenant-Governor concurs generally in these views, and considers that it is too soon to judge whether the tolls are so excessive as to check traffic. Present rates will therefore be continued for two years more at least. The measurements of *through* boats will be made at the terminal locks only.

H. C. LEVINGE,
Joint Secretary to the Govt. of Bengal,
P. W. Department,
Irrigation Branch.

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## APPENDIX A.

NOTE by the CHIEF ENGINEER on the CONTINUATION of the HIGH LEVEL CANAL in ORISSA from BHUDDRUCK to BALASORE.

The committee appointed to visit and examine the irrigation works of the Madras Presidency and Bengal, in the 22nd to 26th paragraphs of their report on the Orissa Canals, chapter IX., discuss the question of the continuation of the high level canal from the present terminus near Bhuddruck on the Salundee to Balasore; and urge the re-consideration of the question of its abandonment for the alternative line along the coast, which had been proposed by the Bengal Government.

2. The dimensions of the high level canal, so far as it has been constructed, are as follows:—Depth of water 8 feet, bottom width 88 feet, side slopes 2 to 1. This gives a width on the water line of 120 feet. The slope of bed is one inch per mile, and the locks are 150 × 20 feet in the chambers.

3. The length of the canal extension from the Salundee, at Bhaddruck, to Balasore is 50 miles, and the fall which has to be overcome is 50 feet. The cost of a canal of the dimensions given in the last paragraph is 43¾ lakhs of rupees, as estimated in detail by Mr. Vertannes, an officer of great experience. Including establishments, tools and plant, and the usual book charges, the estimated cost is Rs. 65 lakhs, or Rs. 1,30,000 per mile. The details of the estimate are as follows:—

| | Rs. |
|---|---|
| Head work on the Salundee - - | 7,03,627 |
| Drainage and protective work - - | 3,61,571 |
| Canal - - - - - | 32,37,612 |
| Short branch to Balasore - - - | 51,049 |
| Total - - - | 43,53,859 |

4. The cost of the canal itself is Rs. 32,37,612, or Rs. 64,700 per mile. In order to compare this with works of similar character already executed, we must deduct lockage, Rs. 5,40,000, leaving the cost of the canal, say, Rs. 27,00,000, or Rs. 54,000 per mile. The cost of the first section of the canal has been Rs. 56,000 per mile, and of the second section, in which, however, there is much less drainage to cross, Rs. 45,000 per mile. The very carefully prepared estimate for the Sone High Level Canal is Rs. 43,500; but in this the great drainages will be passed in large aqueducts; also the canal is of smaller dimensions, being calculated for a width of 75 feet on the water line in the latter part.

5. I am of opinion then, taking into consideration the excessive amount of drainage to be crossed by the canal in the line between Bhuddruck and Balasore, that the estimated cost of Rs. 54,000 per mile is not too high. If it were reduced in width to 60 feet at base, as proposed by the committee in paragraph 25 of their report, some saving might be effected, but not very much. Mr. Vertannes' estimate estimate actually provided for only 60 feet of bottom width in cuttings, the same as that proposed by the committee. When the canal is in embankment no saving is effected by reducing the width, as the cost of the banks is the same, no matter what distance apart they may be placed; some saving might possibly be effected by reducing the width off the syphons; but I feel quite confident that by no expedient can the cost of a canal from the Salundee to Balasore, designed on the principle of low slope of one inch per mile, and providing for the under-passage of the whole drainage by means of syphons and aqueducts, be reduced below the rough estimate made of Mr. Walker, viz., 21 lakhs of rupees for works only, and I much doubt if it could be done for that.

6. In paragraph 25, the committee state that if the dimensions of the canal were reduced to a bottom width of 60 feet, side slopes 1½ to 1, and fall of bed of 4 inches per mile, one lock would be saved, and the cost of earthwork would be reduced by about a half. They consider also that about two-thirds of the drainage might be allowed to enter the canal, and flow across it, passing out again by weirs, and that the cost of the canal might be greatly reduced by these means.

7. Let us now carefully consider these suggestions and see what is involved.

8. I have already stated in paragraph 5 that Mr. Vertannes' estimates provide for a base of 60 feet only in the cuttings, and therefore the saving of half the earthwork, contemplated by the committee, cannot be effected. Of course the committee were not aware that the estimates had been so framed.

9. Owing to the very small supply of water available in the dry season, it is absolutely necessary, as the high level canal is to be treated as a first-class navigation line, that such arrangements must be made as will enable us to impound the water into a series of dead level reaches. The supply of water in the dry season in the Salundee is literally nothing, and the whole 50 miles to Balasore must be fed from the Brahminee and Byturnee; but the second and third ranges of the canal are already supplied from those sources, and therefore it is quite clear that the quantity of water available for the last 50 miles to Balasore will no more than suffice to compensate for loss by evaporation and lockage. Mr. Walker, the late Superintending Engineer of Orissa, writing in December 1877 on the subject of the canal from the Sulundee to the Metai, says: "A discharge of 175 cubic feet per "second, which is required to maintain even the mode- "rate depth of 4 feet in the canal between Kampoora- "Binda and the Metai, cannot be reckoned on in the "Byturnee during the hot months; the whole quantity "of water carried by the river as Aquapudda being "below 175 cubic feet per second for two months to- "gether sometimes." Again, in the same paragraph, he says: "I am therefore clearly of opinion that any branch "canal leading from the high level canal between the "Brahminee and Borabullung must be designed on the "supposition that, during the months of March, April, "and May, the navigation will be maintained by still- "water reaches, through which no greater supply is "passed than is sufficient to compensate the waste from "lockage, evaporation, &c." Now, if all this is true—and I am perfectly satisfied it is so—of a short canal, 17½ miles in length, how much more must it be of a line 50 miles long.

10. Again, if the surface of the canal water is to be maintained in level reaches, and the bed have an inclination of 4 inches per mile, or one foot in three miles; and if we desire to preserve a minimum depth of 5 feet on the lower sills of the locks, with the water at the next lock, pounded up to say 9 feet, the locks must be placed 12 miles apart; these may be of low lift, so as not to lose level unnecessarily; but in this case a greater number will be required, instead of saving one as stated by the committee; while if the lifts are made high so as to save in numbers, the alignment of the canal will necessarily trend more and more towards the coast, and one of the advantages advocated by the committee, viz., the irrigation of the country, must be sacrificed. Again, if the drainage of the country is to be allowed to cross the canal by inlet and escape, as recommended by the committee, it is clear that the canal must be in cutting at the points of crossing, for if the canal water be above the level of the country, obviously the drainage water cannot enter without extensive flooding of the ground.

11. There is another consideration, which appears to have escaped the notice of the committee, viz., that unless the drainage to be crossed by inlet and escape happens to be near a lock, the water would flood down the canal (which it will be remembered is to have an inclination of four inches per mile), and will accumulate below, and burst the banks. The answer to this objection is that the escape weirs might be provided with sluices or self-acting shutters; but these would be dangerous when mountain torrents, carrying large volumes of water, are to be dealt with. In any case I am of opinion that the Kansbans and its feeders should be wholly passed under the canal, and that is the principal and most costly drainage to be dealt with on the line.

12. Examination of the longitudinal section of the high level canal extension shows that for 12 miles, from the 10th to the 22nd, where the canal crosses the valley of the Kansbans and its numerous feeders, the levels have been so arranged as to keep the canal entirely in bank, and thus facititate the under-passage of the flood-water of that river. If the drainage is to be passed through the canal, a lock must be placed at the 10th mile, dropping 8 feet; the surface of the ground and the canal water will then be on the same level, and the drainage can be passed through the canal as proposed by the Committee. But at the 22nd mile the ground again rises rapidly, and a new alignment must be chosen 8 feet below that formerly selected; this will take the line well below the trunk road, and greatly diminish the area available for irrigation under the present arrangements. Again, if we are to pass the streams between the 22nd mile and the end, across the canal, even in part, the latter must be kept in 10 to 12 feet cutting, or perhaps more, as the section shows that they are situated in moderately wide valleys, 4 to 8 feet below the level of the intervening ridges, and not only will the cost of earthwork be thus much increased, but further loss of irrigable area must follow, as the distributaries will take off in cutting, and the water will not come out on the surface for irrigation for some distance down.

13. For the above reasons I am of opinion, if the extension of the high level canal is to be carried out, the work should be constructed on the principles advocated by those who originally proposed the work, and on the alignment chosen by Mr. Vertannes, so as to derive the greatest benefit from irrigation by including the largest area possible, and to keep the canal free from the danger and annoyance of passing the drainage across it, the conditions in this respect being totally different from the proposed coast line.

14. There remains to be considered—(1) the comparative cost of the coast canal, and the extension of the high level, and (2) the advantages of each.

15. In the estimates of the coast canal lately submitted to the Government of India, the cost of range 5 from Balasore to the Metai is given at Rs. 9,20,747 for works only, or Rs. 15,60,000, inclusive of establishment, tools and plant, and the usual book charges, against an actual estimate for the high level of Rs. 43,33,859 and 65,00,000, respectively, or a possible minimum of Rs. 21,00,000 and Rs. 31,55,000, as roughly estimated by Mr. Walker.

16. I have left out of consideration the cost of a link from the Metai to the high level canal at Bhuddruck, because, whichever line may be selected, this link should be constructed. If the coast line be chosen the link should be made of full dimensions and large locks, so as to allow the largest sized boats to go direct to Cuttack *viâ* the high level canal, and if the Bhuddruck-Balasore line be selected, the link is equally necessary for the following reasons, given by Colonel Haig in a note, dated 5th October 1877, paragraph 26: "South of "Balasore the high level to Bhuddruck would be more "favourably aligned for *local* traffic than a low line "along the coast. But it is evident that if the existing "high level canal is to be the main line of traffic "between the Cuttack Delta and Calcutta, it must have "some other navigable connection with the estuaries of "the Orissa rivers and the country on their banks "besides the Kendrapara canal, otherwise it will always "compete at a disadvantage with the sea line. It runs "along the upper margin of the Delta, is skirted by a "low jungly country on the west, and is at the furthest "possible distance from the centres of the most pro- "ductive parts of the Delta. The surplus produce of "the Deltas of all these rivers tends naturally coast- "wise, *viâ* the navigable estuaries and tidal creeks, and "will more readily flow into a canal connecting them "directly with Calcutta than into one which it can only "reach by some 20 miles of land carriage, unless some "additional lines of canal, such as the proposed Jajpore "and Chandbally lines, are made, of which there is now "not the remotest prospect. For this reason I look "upon a navigable connection between the present "high level canal at Bhuddruck and the Metai as much "more necessary to the success of a high level canal to "Balasore than to that of a low level, for the whole "traffic of the Delta would flow readily into the latter "in spite of the undoubted objections to the present "entrance to the Metai, pointed out by Mr. Walker. "a low level canal, connecting the Borabullung at "Balasore with the Metai, could do without the pro- "jected link between the head of the Metai and Bhud- "druck, The high level could not."

17. The comparative advantage of the high level and coast canal are now to be considered—

*First*, as to length—

From Balasore to Cuttack the distance is—

(1) *Viâ* high level canal, 125¼ miles;

(2) *Viâ* coast canal, Metai and Brahminee rivers, and Gobree canal, 148 miles.

For through direct navigation to Cuttack, the high level canal unquestionably has the advantage over the coast canal as regards distance, the former being shorter by 22¾ miles. But for communication to Dhumra, False Point, Pooree, &c., the coast canal is much the shortest.

*Secondly*, as to freedom from interruption in navigation—

There will always be a difficulty, I fear, in maintaining, the navigation across the Brahminee between Ranges I and II of the high level canal, both during the rains and the dry months; the distance is four

miles. During the freshes the current is very strong, and on their subsidence sand shoals will probably be formed in the channel; during the dry months there may not be sufficient water to keep the pool above the weir to the full height required. On the coast canal there is the undoubtedly dangerous navigation of the Dhumra, which is exposed and wide; during stormy weather small country craft would hardly dare to attempt the navigation.

*Thirdly*, as to maintenance—

On the high level canal, weed clearance will be very costly: the expenditure on this head reached during the last year the enormous sum of Rs. 252 per mile on all the Orissa canals, and on the Kendrapara canal, to which special attention was given, Rs. 384 per mile. For 100 miles of the high level this rate would possibly be necessary; silt clearance would not be very heavy, but on the other hand there would be some expense in maintaining banks and river crossings; altogether the cost per mile of maintaining the high level canal in a thoroughly efficient state, suitable for first class navigation, would probably not be less than Rs. 700, which for the 50 miles of the extension would be Rs. 35,000 against Rs. 22,800, the estimated cost of maintenance of the 38 miles of Range 5 of the coast canal. Weeds do not grow in the tidal channel, and in this respect there is an undoubted advantage.

*Fourthly*, from the high level canal there would be irrigation for 150,000 acres of land, while from the coast canal there would be none. In this lies the principal advantage of the high level line; but until actual levels are taken, and minute enquiries set on foot as to the behaviour of the rivers with which the country is intersected, it is impossible to say what might be the cost of distribution; protective embankments would probably be required to a very great extent. Colonel Haig, after carefully considering the question of cost of irrigation in the Midnapore and Balasore districts, states in the 24th paragraph of his note of the 5th October 1877 on the high level canal: "We could hardly reckon on "irrigation in the Midnapore and Balasore districts "yielding higher returns than would defray the interest "and cost of maintenance of the distributaries. If this "view be correct, it is evident that irrigation must be "set aside as an element in the question of the profits "from any line of canal intended to connect the "Hooghly with the Orissa canal and river system. "Navigation is apparently the only source of revenue "to which we can look; and if so, the high level line "discussed in this note stands, I fear, condemned as "pecuniarily impracticable." Without going so far as this, I think it is certain that the expenses connected with distribution in the country under discussion would very greatly reduce the profits from sale of water.

18. In the latter part of paragraph 25, the Committee mention the Ellore canal in the Kistna district, in Madras, and draw a comparison between its cost and that of the high level canal, most unfavourable to the latter. I have never seen this line, but understand that it was dug some 20 years ago, and that it was liable to be breached in all directions almost every year, no provision having been made for cross drainage. For purposes of fair comparison it must be borne in mind that the rainfall in the Kistna district is 37 inches or thereabouts, while in the Balasore district it is 60, and in the Hills, whence the drainage issues between Bhuddruck and Balasore, probably 70; also that while in the Ellore canal, 90 miles in length, there is one lock, in the high level canal extension, 50 miles, there are six. Mr. Vertannes' estimate, Rs. 121,400 per mile, includes all charges, direct and indirect: it is supposed, though it is not so stated in the report, that the estimate for the Ellore canal, Rs. 20,000 per mile, also includes these charges.

19. On the whole, I think the advantages or disadvantages of the alternative line are so nearly balanced, that the scale will be turned, by the question of comparative cost, as given in paragraph 15 above, The estimate of the Coast canal, Balasore to the Metai, is less than half of that from the Salundee to Balasore, taking it at the very lowest figure.

8-5-79. H. C. LEVINGE.

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APPENDIX A1.

I.

*Extract from Letter from the Commissioner of Orissa, No. 54, dated the 12th May 1879.*

II. It is not easy to define by any rigid formula what tolls should be levied, and what should not; but it seems to me that within a fair interest on the outlay, Government may legitimately endeavour to obtain from irrigation and navigation as large a revenue as it can without materially hindering the extension of irrigation or the development of trade. It is urged that the charges are higher than those on the Madras canals and on railways. It would, however, appear that the works on the Madras canals have been less expensive, and I think it reasonable that the charges should have some regard to the cost of the work. If a canal can be built for a small outlay, it will with equal trade pay a fair return with a smaller tollage than a more costly one. That some of the extra cost to the State in the Orissa Canals might have been avoided is perhaps true, but in a note by Colonel Young, Chief Engineer of Bengal in 1858, published at pages 49 to 55 of the Report on the Mahanuddy, by Lieutenant Harris and others, I find some reasons indicating that greater cost in the works here was unavoidable.

12. Again, within the limits of a fair return for the outlay and of causing no material hindrance to the development of trade, I think regard may be add to the costs of the routes the canal supersedes. It is a reasonable justification for high charges on the Suez Canal, that it opens out a direct route instead of the old and long one round the Cape. A private speculator would simply endeavour to secure the largest income he could get. His charges would necessarily be less than those of the route he tries to supersede, because otherwise he could drive all traffic the other way. Below this limit he would fix the rates which, according to his estimate of the traffic they would bring to him, would pay him best.

* * * *

13. The question then comes for decision whether the rates that have been fixed will hinder the development of the trade materially.

14. The question was carefully argued in the late Superintending Engineer Mr. Walker's note on the subject, addressed to Colonel Haig in April 1878. There is nothing to show that the increased tolls have in any way led to materially decreased traffic, while they have certainly yielded a considerable increase of income. The principle staple of Orissa is rice. Traffic has decreased as it was foreseen it would at the time the change of rates was made on account of the cessation of the demand for the famine in Southern India. The decrease does not appear to be materially greater in the canals than it has been elsewhere. The trade of the Balasore ports, of which but a little for Chandbally passes through the canals, has decreased about as much as that of False Point, which almost entirely passes through them.

15. It will be seen from paragraph 9 of the Commissioner's note that prices ordinarily range much lower in Orissa than in the districts above Calcutta. The port charges at False Point and Chandbally are lower than those of the Hooghly. It should therefore ordinarily be to the advantage of shippers to buy at False Point and Chandbally at prices even a shade higher than at Calcutta. It would follow therefore that the rice can afford to pay for its conveyance to those ports, and there is no apparent reason why it should not pay. The charge for tollage through the Kendrapara Canal is Rs. 3 per 100 maunds in the dry season, and Rs. 1-8 in the rains when the rivers are open and complete. The charge is thus under half anna per maund in the dry season and quarter anna per maund in the rains. The rate being fixed by measurement the actual charge may be a little higher; but even at one anna for the dry weather and half anna for the rains, it would not be a very serious addition to the price to the consumer, or decrease in the price paid to the producer. In the letter of the Collector of Cuttack he says that the rates are now paid out of the profits of the trader. I see no reason to think that this is the case. It seems to me that the trader can well and does take good care to secure a return for his labour and capital. The first effect of a transit toll is an attempt to raise the price to the consumer; competition from other sources ordinarily interferes and it may be that the full increase cannot be got. The next consequence is that the trader decreases the price he pays. Practically the effect of the rate falls on the producer, not on the trader. Prices,

notwithstanding the good harvest of last year, are still very high for Orissa, though, as compared with prices about Calcutta, they leave a fair margin for the trader.

16. The Committee call attention in paragraph 37 to the small number of boats and and make a comparison with the Madras Canals not to the favour of Orissa. I have not seen the Madras Canals, nor am I well acquainted with the extent of navigable channels in Madras, but coming to Orissa from Bengal with its great rivers and tidal channels running in all directions full of life and traffic, I was as much struck as the Commissioners by the absence of boats in Orissa. It is not, however, very difficult to account for. There are in fact no navigable rivers and few navigable channels of any sort. The three great rivers that pour from the central tableland through the comparatively barren but happily increasingly prosperous tract, known as the Tributary States to Orissa, are almost dry except during the rains when one or two floods occur. During these, boats laden with rice and other produce at great danger pass down the rocky river beds to Orissa and find their way back. The rivers are, however, almost dry in the dry season; even within the limits of Orissa, navigable cross channels from one to the other hardly exist. As the rivers approach the sea they become great arms dreaded by ordinary boats almost as much as the Hooghly below Diamond Harbour.

Our canals are in fact almost the only navigable channels, their lengths are short and the boats on them are not numerous, but they sufficed during the famine in Southern India, after fairly good harvests to drain Orissa of rice so completely as to produce a panic lest the stocks left should fail before the harvest; when the Coast Canal is finished it will permit of boats being used to carry traffic for long distances, and I look forward then to see boats of the Bengal type being made and used for long voyages. At present I do not think there is much chance of any very large increase, and I believe that a reduction of the rate would decrease our tolls largely, but would not materially increase our traffic.

17. In paragraph 13 the Committee use a language which leads to the impression that they think empty boats should not pay any toll. I do not see why even an empty boat should have the use of our canal, and put us to the trouble of opening and closing our lock gates for it, without paying any toll. I would, however, not object to a charge of half the tollage on return empty boats. It also strikes me that the levy of passenger rates, in addition to the displacement rate on passenger boats, is hard. I would levy by one or other of the two rates at the discretion of the canal officer, but not both. I am also not sure whether the rate on steamers is not too high. The weight of their machinery is great, and they are used rather to carry passengers and tow boats that pay separately than for cargo of their own. Rates for them may perhaps also be reconsidered.

18. On the question of the levy of lower fares between Cuttack and Chandbally we have at present but one steamer and find we can get all the traffic we can take. It is found in practice that the boats without the steamer do not attract. It would be difficult to take boats between Patamondee and Chandbally with regularity without the steamer, and when the steamer runs half-way it may as well run the whole way. at all events so long as there is only weekly communication between Chandbally and Calcutta. If we could start boats at a cheap fare to run from Chandbally to Cuttack they might perhaps attract passengers. The communication between Patamondee and Chandbally would, as I have said, be difficult. Nothing stands in the way of private trade opening such a line, if it will pay, and notwithstanding the difficulty indicated, I think it very likely that it would.

19. Between the 1st July and the 1st November the old toll rates will take effect; the revised ones will, unless it be decided to effect a reduction in the interim, be renewed from the 1st November. The Collector has advised that they be not renewed, and he says Mr. Beadon was of the same opinion. I enclose copy of Mr. Beadon's letter, No. 103, of the 3rd February, written to me before his departure on furlough. It will be seen that Mr. Beadon was struck by the decrease of traffic shown in the Gazette of the 22nd January last. This reduction was fully anticipated and was mentioned as certain to ensure when (see paragraph 2 of my No. 30 of the 8th June last), I advised the increase of the tolls. It was due for the most part to cessations of the demand for rice in Southern India. Mr. Beadon has formed no definite opinion that the tolls should be reduced. Beyond making a reduction for return empties, charging passenger boats at only one of the two rates, and revising steamer rates, I am not at present prepared to advise reduction. I consider that the effect of the rates should be carefully watched. If it be found that it really tends materially to impede the development of the trade, I would be prepared to advise reduction; but so far I am not satisfied that it has had that effect. On the question of registering boats, it seems to me that, if the rate is fixed so high as to be a fair equivalent for the rates on shewy traffic, it may save some trouble; only boats so employed will be registered, unless the rate is fixed at a low rate, and then the canal would lose.

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## II.

*Extract from Letter from the Collector of Cuttack, to the Commissioner of Orissa, No. 450, dated 20th April* 1879.

8. With reference to the proposal of the Commissioners as to tolls, paragraphs 36 to 39, I enclose a copy of a communication from the principal Carrying Company of Cuttack, which entirely endorses the Commissioners' views. It is certainly proper to realize as large a revenue as practicable from the canals, which are so unremunerative. But I fear that in doubling the dues on the 1st November last, we pushed this principle too far and over-reached ourselves. There had been no inquiry to ascertain whether the trade of the country could bear such high rates. It consists chiefly of rice, an article of great bulk in proportion to its value, which cannot, I believe, support an impost as Rs. 3 per 100 maunds comes to when calculated on the displacement. It is said that if merchants object to these charges they can use the roads and the rivers. But in fact the canals have a monopoly of traffic, for there is no road to False Point, and by dividing the water we have practically closed the rivers. Since the new rates were established there has been a marked falling-off in trade, as compared with the preceding years. This may be in the main due to general causes, and I believe that the full effect of high charges will not be felt for some time. The rates are now paid out of the profit of the traders, who are thus heavily mulcted. This cannot go on for ever, and if the system is continued, I fear that capital will by degrees be withdrawn from the carrying trade of Orissa, and we will be left as we were some years ago to work the canals with a Goverement flotilla at a loss. The enhanced rates terminate on the 30th June, and I think they should not be renewed. As to whether they should be replaced by a system of licensing boats or simply by the old rates, I am not at present prepared to give an opinion. Annual licenses give an undue advantage to boats used regularly and exclusively on the canal, over those which make only occasional trips, and licenses for short periods seem to have no special advantage over charges on the voyage, particularly where there are locks. On the question of reduction of rates, I express the opinion of my predecessor as well as my own, but on the novel point suggested by the Commissioners I would not like to report until I have had more experience of the canals.

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## III.

*Extract from Letter from the Superintending Engineer, Orissa Circle, No. 1298. dated 1st May* 1879.

21. *Tolls.*—There remains the question of reduction of canal tolls and introduction of a system of licensing to be considered. From what I heard when I first came here, I was led to believe that the tolls were too high, and that this was the generally received opinion; but on looking more closely into the matter, I am less confident about it, though I still think the increase of rate from November to June, to double of what it is during the months July to October, is somewhat excessive.

22. In reply to another letter from your office on the subject of canal tolls, I have entered into some detail and need not recapitulate here. The results that I arrive at are briefly that—

(I.) On the Kendrapara Canal the traffic has been reduced (with increased tollage); but it is impossible to ascertain whether this is due only to the cessation of demand for the Madras famine, or also partly to enhanced rate of tollage;

(II.) On the High Level Canal there has been a similar decrease of traffic more clearly due to increased tollage rates, though other possible causes prevent this conclusion from being fully established;

(III.) On the Gobri Canal there has been considerable decrease, and the evidence seems tolerably conclusive that the high charges on the on the terminal and entrance locks (former especially) have been the main cause of the decrease;

(IV.) On the Taldanda Canal, where there is no double rate for the four monsoon months, the rate, 8 annas per 100 maunds for passing through or simply locking in, has had the effect of diminishing the traffic by about 30 per cent., comparing the returns of the last six months with those of the six months immediately preceding, or at any rate the diminution appears to be chiefly due to the increased rate since October last.

23. In all these cases the figures extend over too small a time, and there are too many other reasons to account for fluctuation in the traffic to allow of any decided opinion being arrived at, and the Commissioner seems inclined to leave the existing rates unaltered for, at any rate, one year, from the time they came into force, and to think that we have hardly data enough yet to make out any scale for licensing boats by the year.

24. With the exception of some minor alterations noted in my letter to your address alluded to above, I believe it will be best to leave the rates as they are, and that when the tolls fall (under the existing rules) in July, it will be well to revise them, for, as I said above, I think the rates from October to June might with advantage be reduced somewhat below their present figure.

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## Appendix B.

No. 1293, dated Calcutta, the 28th April 1879.

From Major J. M. Heywood, R.E., Superintending Engineer, South-Western Circle, to the Chief Engineer, Bengal, Irrigation Branch.

I have the honour to acknowledge the receipt of your letter No. 13,911, of 4th April, with its enclosures, being correspondence connected with the report of a Committee appointed to visit and examine the irrigation works of the Madras Presidency and of Bengal.

2. I am called upon to submit a report on the subjects touched upon and my attention is more especially directed to paragraphs 14 and 15 of Chapter X.

3. In paragraph 13 the Committee compare the tollage on the Orissa and Midnapore Canals, and come to the conclusion that the rate on the Orissa canals is 2·37 pies per gross ton per mile, and on the Midnapore Canal 8·56 pies per gross ton per mile, apparently a clerical error for 6·53 pie.

4. The rate in the Kendraparah Canal is Rs. 1-8 per 100 maunds for the whole distance; this is a special through rate, but the ordinary rate is As. 0-8 per 100 maunds at each toll station, of which there are four in all, one at each end of the canal and two intermediate, the total number of locks being eight. The rate of toll in the canal is therefore for the through passage a little over two pie per ton per mile. This rate is doubled for the months from November to June inclusive.

5. On the Midnapore Canal there are seven toll stations and twelve locks. In all the canal is divided into five ranges of unequal lengths, and the tolls levied are annas 6, 8, 10, 12, and 12 respectively, the total being Rs. 3 per 100 maunds for the total distance of 52 miles (including river crossing), equivalent to a rate of 3·01 pie per ton per mile, or, taking merely the canal proper at 48 miles, 3·26 pie per ton per mile.

6. The comparison between the two canals on the gross tonnage of the boat is therefore—

| | |
|---|---|
| Kendrapara Canal | 2 pie per ton per mile for the through passage for four months.<br>4 pie per ton per mile for eight months; mean 3·33 for the year. |
| Midnapore Canal | 3·26 pie per ton per mile for whole year. |

7. In my letter No. 3,479, of 30th October, paragraph 3, I gave the proportion between the actual weight of cargo and tonnage of boats on which tolls are levied as follows:—

| | |
|---|---|
| Kendraparah Canal | 1 to 1·37 |
| Hidgellee Canal | 1 to 2·11 |

as the boats plying on the Hidgellee Canal are similar to those employed in the Midnapore Canal. The tollage per ton mile of actual cargo carried will be on the Kendraparah Canal 4·56 pie, and on the Midnapore Canal 6·88 pie.

8. The rate is doubtless apparently a high one, but as far as the officers of the department are aware is borne without any complaints.

9. From a reference to the revenue report for 1877-78, it will be seen that the gross private tonnage in 1877-78 was 3,58,717 tons, and the value of cargo Rs. 1,70,97,230. The tonnage of the actual cargo being probably 170,007 tons, the value per ton is about Rs. 100. The tollage collected was Rs. 1,06,718, or about 10 annas per ton, viz., $\frac{1}{160}$th of the value of the cargo, and this is I consider the only correct method of determining whether a rate is too high.

10. The table entered below gives the data for the years 1873 74 to 1877 78, including both private and public traffic, the latter of which is omitted in the preceding paragraph:—

| —— | 1873-74. | 1874-75. | 1875-76. | 1876-77. | 1877-78. | Remarks. |
|---|---|---|---|---|---|---|
| Gross tonnage - - tons. | 1,14,960 | 1,68,090 | 1,89,414 | 2,40,005 | 3,60,970 | In calculating the actual tonnage of cargo, I have assumed that the measurement of the boats gives a result equal to 2·11 times the real weight of the cargo. |
| Actual tonnage of cargo - „ | 54,483 | 79,663 | 89,770 | 1,13,746 | 1,71,076 | |
| Value of gross tonnage in - Rs. | 91,37,584 | 1,18,23,308 | 1,22,07,919 | 1,13,26,866 | 1,71,09,384 | |
| Do. per ton of actual tonnage in - „ | 167·71 | 148·42 | 136·00 | 90·79 | 100·00 | |
| Value of tollage collected - „ | 32,994 | 45,512 | 51,494 | 67,276 | 1,07,635 | |
| Proportion to value of cargo „ | ·00361 | ·00385 | ·00422 | ·00594 | ·00629 | |

11. Extending our view beyond the canal itself, it is found that the rate charged by boatmen for the carriage of goods from Midnapore to Calcutta is Rs. 15 per 100 maunds of actual load, *plus* Rs. 3 per 100 maunds of gross load paid as tollage, or Rs. 21·33 per 100 maunds of actual cargo, viz., Rs. 5·8 per ton, equal to about 1-17th of the value of the articles carried in 1877-78. The rate per ton per mile on the actual load is 15·4 pies per ton per mile, the tollage being rather more than one-fourth of the whole cost of carriage.

This rate, though high, is willingly given, and the rate is said to have risen last year, during the period when traffic was most active, to 39 pie per ton per mile, exclusive of the charge for tollage.

12. The following table shows the tollage on the Midnapore Canal during the last nine years:—

| | |
|---|---|
| 1870 71 | 13,348 |
| 1871-72 | 12,759 |
| 1872-73 | 21,188 |
| 1873 74 | 35,193 |
| 1874 75 | 45,606 |
| 1875-76 | 51,494 |
| 1876 77 | 67,276 |
| 1877 78 | 107,635 |
| 1878 79 | 76,090 |

So that omitting the year 1877 78, when an exceedingly brisk trade sprung up with Calcutta, owing to the demand for grain for Madras, a very steady increase is perceptible for each year since 1871-72, and this has occurred in spite of much that has tended to interfere with the navigation. As the lock at Lutchmutpore failed in September 1876, and was not opened till the 25th October 1877, and the Dainan lock, which showed signs of failing, was closed in November 1878, and has not yet been re-opened; in fact, we have hardly known in late years what it is to have a year of uninterrupted traffic.

13. Looking, therefore, to the large margin of profit which remains after the carriage and toll dues are paid,

and to the fact that the traffic is steadily increasing, it would, I think, be premature to adopt any alterations generally in the tariff as now established.

14. The Committee, however, propose discriminating rates to allow of the carriage of such commodities as straw, firewood, and perhaps laterite, at a reduced tollage. I give below the details of the traffic in these articles, as gathered from the returns for the year 1878–79 :—

| —— | Number of boats. | Weight of cargo. | Value of cargo. | Tonnage of boats. | Tollage. |
|---|---|---|---|---|---|
| | | Mds. | Rs. | Tons. | |
| Straw - - | 536 | 89,968 | 36,350 | 9,733 | 1,246 |
| Firewood - | 151 | 13,323 | 3,998 | 1,391 | 189 |
| Laterite - | — | — | — | — | — |

The tollage is therefore about $\frac{1}{30}$th the value of the cargo in the case of straw, and $\frac{1}{21}$st in the case of firewood for laterite. No demand has as yet sprung up.

15. I think there is but little doubt that if the carriage of straw could be largely reduced a great boon would be conferred on the cultivator, but the objections are given very clearly by Mr. Apjohn, late Executive Engineer of the Cossye Division, when Colonel Haig proposed that straw boats should be passed free through the canals. He writes: "I am not so sure of the advisability of "letting straw boats through the canal free of tolls, as "I fear it would produce two evils, firstly, smuggling "of other goods under the straw, and, secondly, corruption and oppression on the part of the toll collectors "and lock khalassies, who would most probably, unless "feed, insist on pulling down every straw stack to look "for other cargo, and in the end the exporter would "pay nearly as much as the amount of the regular tolls. "Also straw boats are a very great obstruction to other "traffic in the canal, as they are generally drifted by "the wind right athwart the canal, and they are so high "that the tow-ropes of other boats cannot pass them "without great difficulty and during a great portion of "the year, when the southerly wind blows right across "the high level canal, they would find the greatest "difficulty in navigating it. In the tidal reaches they "are sheltered from the winds by high banks and in "the Hidgellee Canal they run up before the southerly "wind. The distance is so great from the upper reaches "to Calcutta, that the cost of boating such a very bulky "and awkward article as straw, which would have to be "dragged the whole distance along the canal generally "with a side wind blowing, would probably be very "great, and even without the tolls prohibitory."

The Executive Engineer goes on to write: "The "above is of course only the opinion I have formed on "*à priori* grounds, and facts may hereafter cause me to "modify it, and perhaps there would be no great harm "done if a trial be made of letting straw through free "of tolls, but I predict the above difficulties."

16. Whether these difficulties would render the lowering of the tolls of little effect it is difficult to state with any confidence; but I should suggest that no alteration take place until the matter has been discussed most fully with the Engineers and Revenue authorities in charge of the Circular Canals.

17. The Committee also propose that the boatmen may be given the option of registering their boats and taking out quarterly or yearly licenses. This system obtains in the Godavery and Kistnah deltas, and in the canals in Northern India, while the system of measuring the boats is one which, adopted in the canals round Calcutta at least 14 years ago, has since been extended to all those recently constructed. At first sight the licensing system seems preferable as likely to obviate the necessity of constant interference on the part of the canal subordinates; but as a matter of fact I believe that measurements are seldom complained about. I have heard from an officer who was in charge of canals in Orissa that no complaints were ever made, and in my experience on the Sone and the Midnapore and Hidgellee Canals I have never had any references made by the boatmen on the subject, but any alteration in this Circle would have to be taken up in connection with the Circular Canals, the tolls on which are collected by the Revenue authorities, and which amount to upwards of four lakhs of rupees a year, whereas the total of the tollage from cargo boats in the Godavery delta has not exceeded Rs. 34,250.

18. The Executive Engineer, Cossye Division, records his opinion as follows :—

"I have no objection to offer against the licensing system, but I am not aware that any desire has been expressed by owners of boats for its introduction; if it is considered desirable to give it a trial, I should be glad to have a copy of scale of fees levied in the Madras Canals."

19. If the owners of boats are satisfied with the system now in force, and if in reality there is no hardship felt from the constant recurrence of measurements of tonnage, I see no reason why an alteration should be made which, as far as I can see, must lead to a loss of revenue and render the chances of the canals ever paying still more remote.

20. The Committee, in paragraph 15 of their report on the Midnopore Canal, make the following remark: "But the Committee would point out that the maintenance charges are excessively high, viz., Rs. 1,170 "per mile, and about Rs. 100 per mile of distributary. "These charges are more than double those on the "Orissa Canals, to which they have already taken "exception as being too high, and there seems no "special reason to account for what they cannot but "term extravagant expenditure."

21. The Midnapore Canal consists of four different reaches; the first commencing from the head 25 miles long, fed by water admitted from the Cossye near Midnapore; the second 11¼ miles long supplied from the Cossye at Panchkoorah; the third a tidal reach between Roopnarain and the Damoodah, hitherto left open; and the fourth a tidal reach between Damoodah and the Hooghly, locked at both ends.

22. The first, second, and fourth reaches, in reality independent canals, are all liable to be heavily silted, and no fair comparison can be made with other canals unless the circumstances are the same.

23. The cost of maintenance in 1877–78 may be divided as follows :—

| | Rs. |
|---|---|
| Head-works and workshops - - | 9,728 |
| Maintenance of locks, buildings, and canals - - - - | 41,028 |
| Reconstruction of Lutchmutpore lock - | 26,536 |
| Silt clearance including steam dredger and scraper - - - | 39,072 |
| | 116,364 |

24. The re-construction of the Lutchmutpore lock being omitted, the lock having failed, the total cost of maintenance becomes Rs. 89,828, and from this the following deduction should be made :

| | Rs |
|---|---|
| Raising chambers of Panchkoorah locks - - - - | 9,517 |
| Strut gates to Bansberriah locks - | 1,777 |
| Remodelling road sluice in Range I. - | 3,874 |
| Total - - | 15,168 |

leaving Rs. 74,660 as the actual cost of maintenance.

Of this, Rs. 9,728 was expended on the head works; Rs. 25,860 on maintenance of locks, buildings, &c.; Rs. 39,072 on silt clearing and dredging, or on a length of 19 miles. Rs. 1985 per mile for headworks; Rs. 527·7 for maintenance of locks, &c., and Rs. 797·3 for removal of silt.

25. The very great cost in removing silt is in the first place attributable to the fact that the Oolooberiah and Bansberriah portion of the canal had not been cleaned out for seven years, during which time 84 lakhs of cubic feet of silt had accumulated, for which a sum of Rs. 29,321 were paid in the year: this should more correctly have been spread over the seven years.

26. An attempt was made last year, from the experience gained in past years, to forecast the probable expenditure in future years with the following result :—

| | Rs. |
|---|---|
| Head works - - - | 6,000 |
| Masonry works, buildings, earthworks, &c. - - - - | 25,700 |
| Silt clearing - - - - | 15,700 |
| Dredging and weed clearing - - | 12,000 |

total 59,400, or Rs. 1,212 per mile, or without head works Rs. 1,089 per mile.

27. The Kendraparah Canal in Orissa cost for maintenance, without including head works, Rs. 890 per mile.

On this point of comparison between the Orissa and Midnapore Canals, Mr. Unwin, Executive Engineer, Cossye Division, who had charge of one of the Orissa divisions, makes the following remarks :—

"The comparison of the maintenance charges in Orissa and Midnapore are, I venture to submit, somewhat misleading. I admit that our charges are high, even excessive; but the comparison should not be made between the Orissa Canals, 114 miles in length, and our canal 48 miles only. In the former three out of the four canals, aggregating 75 miles, have little or no traffic on them and but few locks. The fourth canal, Kendraparah, 39 miles, is the only one which offers a fair comparison with the Midnapore Canal, and taking the figures for 1876–77 the cost of repairs per mile on that canal is Rs. 933, against Rs. 1,170 on the Midnapore canal. The former canal has eight locks, only two being terminal. We have ten locks, six being terminal; we shall have 12 locks, eight being terminal, and as the cost of our repairs is largely due to silt clearance at the terminal locks; I think our charges are not more excessive in proportion to the work done than they are on the Kendraparah canal."

The comparison between a canal liable to be silted at six places, and in a very short time at eight places, with a canal where the silt can only give trouble at two places, is manifestly an unfair one.

28. The comparison the Committee make between the maintenance of the Orissa Canals and that of the Madras Canals is one I am unable to discuss; but I can only reiterate what has been stated above, that the silt admitted from several fresh sources into the canal is the real cause of the excess expenditure on the Midnapore Canal, and that our efforts are now directed to the introduction of improved machinery for dredging.

29. The whole subject of the cost of maintenance was very fully entered upon in the Revenue Report of 1877–78, and, according to a statement received from the Examiner, subject to corrections, when the complete accounts are compiled, the expenditure amounts to Rs. 55,523 as per statement attached, being at the rate of Rs. 1,133 per mile, inclusive of head works, or about Rs. 983 per mile, exclusive of that charge. Even this is vitiated as a guide for the future, as the silt in the first 37 miles of the canal cleared out in the past official year had been allowed to accumulate for more than three years, so that a portion at least of the expenditure should not be debited to the year.

30. The cost of maintenance of the distributaries was, during the year 1877–78, Rs. 24,970, or a rate of nearly Rs. 98 per mile. Of this sum, as explained in paragraph 22 of the Revenue Report for the year in question, Rs. 6,600 were spent on about 1¼ mile of the Naraingbur distributary, where the water is high above the ground level, and the banks are of such bad soil that enormous slips were constantly taking place. Disastrous breaches were only prevented by driving double rows of piles at the toe of the embankment, about three feet apart, digging out the earth between to a depth of six feet and replacing it with rubble stone. The slips, however, occurred in fresh places, and it was then determined to lower the surface level of the distributary by two feet.

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### Cossye Division.

#### Main Canal and Branches.

*Comparative statement showing the estimated amount and the amount of expenditure incurred during* 1878–79 *on account of the works detailed below :—*

| Particulars. | Amount of estimate. | Expenditure. | | |
|---|---|---|---|---|
| | Rs. | Rs. | A. | P. |
| Maintenance - - - | 7,966 | 7,363 | 7 | 5 |
| Toll contingencies, lock gates - | 1,717 | 1,296 | 7 | 3 |
| Maintenance of locks - - | 5,722 | 4,381 | 15 | 3 |
| Ditto of bungalows - | 4,615 | 3,810 | 3 | 6 |
| Ditto of earthwork - | 11,810 | 11,310 | 9 | 9 |
| Silt clearance - - | 21,887 | 20,834 | 11 | 7 |
| Working steam dredger - | 4,081 | 2,874 | 10 | 8 |
| Ditto scraper dredger - | 4,504 | 3,650 | 5 | 11 |
| Total - - | 62,302 | 55,522 | 7 | 4 |

Deducting this expenditure on the 1¼ miles of distributary, it will be seen that the rate per mile for the remaining 254 miles was a little over Rs. 72 per mile.

31. On this point the Executive Engineer, Cossye Division, remarks: "I am not able satisfactorily to "explain the extraordinary difference in the cost of "repairs to distributaries, being at the rate of Rs. 44 "per mile in Orissa and Rs. 100 per mile in Midnapore. "The rate in Orissa varies from Rs. 27 on the Kendra- "parah Canal to Rs. 70 on the High Level Canal. The "low rate on the former is, I believe, due to the fact "that from 50 to 60 miles of minor channels, which "did not when I had charge of them entail much cost, "are included in the total length of 314 miles.

"Our channels are also of greater sectional area, and I find with 255 miles we command 1,48,600 acres. while the Kendraparah Canal, with 314 miles only, commands 85,750 acres: this is a very important element in the comparison which the committee do not seem to have considered. In Orissa the cost of repairs to distributaries on each acre commanded is Rs. 0·146; on the Midnapore Canal it is Rs. 0·17."

32. The rate of repairs on the distributaries will most probably reduce year by year as the banks become more consolidated and the traffic with pack bullocks diminished with the opening out of the district roads. This traffic considerably increases the cost of repairs; and it is understood that the Road Cess Committee have several projects in hand for widening out one bank as a roadway on some of the distributaries, if carried out, the charge of the future maintenance will no longer fall on the department. In conclusion I would sum up with regard to the observations of the Committee :—

1st.—The tollage on the Midnapore is larger than that collected on the Orissa canals, as the boats in the two canals vary in their build, those in Orissa apparently carrying less dead weight in proportion to their stowage area. The boats on the Midnapore Canal are, however, similar to those plying in the Circular Canals near Calcutta, and any alteration in the method of assessing the tolls should be settled in communication with the authorities in charge of those canals;

2nd.—The tollage is undoubtedly high, but not higher than the articles carried can bear, and the traffic has gone on steadily expanding;

3rd.—A very large portion of the traffic is carried through the tidal reaches which connect long lines of important waterways, for instance the Roopnarain, Damoodah and Hooghly. The tollage in such cases, when the length of the voyage of the boat charged with tollage is taken into consideration, is a very small item—

Thus in 1877–78—

20,874 boats passed through the range connecting the Damoodah with the Hooghly;

8,179 through the range between the Roopnarain and Damoodah;

9,399 through the range between the Cossye and Roopnarain;

13,720 through the range between the Cossye at Midnapore and Cossye at Panchkoorah;

4th.—Since September 1876 two locks have failed and uninterrupted traffic has been only carried on for about one-third of the period between that date and the present;

5th.—Discriminating rates in the commodities mentioned by the Committee, with the exception of laterite, for which no demand has yet arisen, would probably lead to smuggling and oppression on the part of the canal subordinates and servants, and any alteration made on the Midnapore Canal should be carried out in communication with the authorities in charge of the Circular Canals;

6th.—Registering the boat and taking out quarterly or yearly licenses would be a complete alteration in a system adopted for many years in Lower Bengal, and, considering the swarms of boats which navigate the tidal creeks and network of rivers near Calcutta, I think it probable that a large number of the 46,341 boats passing the toll stations in 1878–79 were casual passers through rather than regular pliers on the canal;

7th.—Complaints on the part of the boatmen regarding measurements are, I believe, almost unknown;

8th.—The maintenance charges are high. They have been much increased in recent years by charges for rebuilding locks which have failed, &c., but the maintenance charges proper are also likely to be in excess of those on other canals as there are not less

than six places where the siltage difficulty has to be met: and this year the number will be increased to eight. Independently of the siltage induced in the canals, the siltage which takes place at the entrances requires the continual use of dredgers. A reduction in cost is expected by the introduction of new and improved machinery. The Committee took their figures for a year in which one portion of the canal was cleared of silt which had accumulated for seven years. The cost of repairs has been reduced during the past year, and will, it is hoped, be still further reduced in the present year;

9th.—The rate for the maintenance of the distributaries is high. It is expected that it will be reduced year by year, and that as the banks are much worn by traffic the Road Cess Committee of Midnapore will relieve the Irrigation Department of the cost of a portion of the maintenance.

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## Appendix C.

*Regulator at the head of the Arrah Canal, Sone Canals.*

### Note by the Chief Engineer.

Annexed is a report on the subject by Mr. Walker, Superintending Engineer, Sone Circle, who gives full particulars of levels and calculations of the discharges. Mr. Walker considers the best remedy for the undoubted defect of want of regulation of supply to the Arrah canal is to raise the banks of the lower end of the main western canal. This would have to be done for the two miles of the Buxar canal also, which Mr. Walker has omitted to notice. The effect of this arrangement would be to enable the canal officer to raise the level of the water generally in the main western canal, and thus to give a greater head for discharge at the offtake of the Arrah canal. Had the original intention been carried out, and the main western canal been completed as designed, there would certainly not have been any necessity for a regulator, as the larger supply required for the whole series of canals would have given the necessary head at the Arrah canal offtake. But the main canal has been stopped at the 22nd mile, and is, as described by the committee, a "fragment"; hence the full volume, as originally intended, cannot be admitted, and therefore Mr. Walker proposes to impound the water below, to such a level as will suffice to give the required head. His proposal is to raise the canal banks about 2½ feet. He has, however, omitted to notice that the Buxar canal and the other large distributaries will, when running in full supply, draw off 1,774 cubic feet per second, the effect of which will be to lower the water at the end of the "fragment" about one foot, and therefore there would not, if his proposal be adopted, be any necessity to raise the embankments more than 1½ feet. There is, however, one serious drawback to the above arrangements, and, without much further enquiry, I should not like to commit myself definitely to agree to the proposal:—

| | Miles. |
|---|---|
| The length of the main canal is - - - - | 22 |
| Ditto of the Arrah canal above lock No. 1 - | 7 |
| Ditto of the Buxar canal and above lock No. 1 - - - - - | 2 |
| | 31 |

There is thus a length of no less than 31 miles of canal *in one pool*, and that at the very head of the whole canal system at Shahabad. It will probably be said we should not contemplate an accident, but I think such a contingency cannot be ignored altogether. Now the result of a breach anywhere in this 31 miles would paralyze the whole of the irrigation until it could be stopped, and some days would certainly be required to effect the repairs, and fill up the canals again. The injury to the country that would inevitably result from the sudden letting off of 31 miles of water impounded in the widest and deepest canals in Bengal should not be left out of account in considering this question. I am therefore opposed to the arrangements proposed by the Superintending Engineer, as the danger of breaches occurring is already considerable, and any further raising of the banks would aggravate it. The material of which the banks are composed is friable black soil, liable to crack and split open in dry weather, but tolerably retentive when well consoldated. I may here mention that a serious breach, which caused great inconvenience and loss of water, did actually occur on the 17th mile of the main western canal last June, and that the whole length of 31 miles of canal, as above mentioned, was completely emptied by it. The breach occurred when the canal was filled up after a closure of two months; the cause undoubtedly was the splitting and cracking of the banks during the two months of hot dry weather when they were exposed to the air. The water on being re-admitted —perhaps too fast—made its way through the bank at a point where it joined the wing wall of a syphon aqueduct, from which it had shrunk away and separated.

I am of opinion, then, that the regulation of the water at the head of the Arrah canal should be accomplished by means of a set of regulating sluices or moveable dam, with a low lift lock on the main western canal, just below the offtake of the Arrah canal; but I think there is no immediate necessity to take the work in hand, and that it may be kept in abeyance until it is seen if there is sufficient money from savings on the estimates already sanctioned with which to carry it out.

H. C. Levinge,
The 10th May 1879. Chief Engineer.

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*Extract from a Letter from the Superintending Engineer, Sone Circle, No. 1674, dated the 3rd May 1879.*

As to the need of a regulator at the head of the Arrah canal, the existing state of affairs is as follows:—

The main western canal has a bottom width of 180 feet side slopes of 2 to 1, a depth of 9 feet (when the Sone is flowing 1 foot deep over the weir), and 6 inches per mile bed slope. These dimensions are maintained for a distance of 5 miles, at which point the Arrah canal is thrown off, and they are calculated, by Bazin's formula, to give a discharge of 4,342 cubic feet per second. Of this amount the Arrah canal is supposed to take off 1,393 cubic feet per second when the main western canal has the full depth of 9 feet.

The dimensions proposed for the Arrah canal to obtain a discharge of 1,393 cubic feet per second were as below:—

| | |
|---|---|
| Bottom width - - | 86 feet. |
| Side slopes - - | 2 to 1. |
| Full supply depth | 7 feet. |
| Slope of bed - - | 6 inches per mile. |

From these data the discharge calculated by Bazin's formula is 1,393 cubic feet per second.

At first, I understand, it was intended to have a uniform bed inclination throughout the first reach of the Arrah canal, from its offtake from the main western down to lift lock No. 1, at Delabagh. At its head, therefore, the bed would have been two feet higher than the main western at that point.

As actually constructed, however, the bed was carried on at the same level as the bed of the main western (viz, 323·50 + datum) at the bifurcation for a distance of three miles 2,100 feet. From 3 miles 2,100 feet down to lift lock No. 1, at 5 miles 3,900 feet, the bed of the Arrah has an inclination of six inches per mile.

To obtain the full discharge of 1,393 cubic feet per second in the Arrah canal, it is necessary to have the full supply depth of nine feet in the main western. With this depth the water level at the head of the Arrah canal should be 332·50 + datum. But the banks of the main western canal from the 12th mile to its present terminus at 21 miles 3,000 feet are only 334·00 + datum, so that (there being no escape as yet) with a water level of 332·50 at the bifurcation, there is a dangerously small margin of 18 inches between the canal surface and the top of the banks throughout the last nine miles of the main western canal.

The standing orders for the regulation of water in the main western canal therefore limit the level of the water at the bifurcation to 332·00 + datum.

It is asserted that with the water at this level the 1,393 cubic feet per second cannot be sent down the Arrah canal; and this led the committee to suggest that a regulator should be built (if I understand their proposal aright) in the main western canal, either below the head of the Arrah, or a little below the head of the Buxar canal, which leaves the main western at the end of the 12th mile.

The level of the lip of the regulating weir at lock No. 1, as built, is 325·72, and the bed of the Arrah canal is there 322·80. The weir consists of three bays, each 21¼ feet in length, say 64 lineal feet over all; deducting the width of six iron stanchions, each 4 inches broad, we have 62 clear feet of overflowing water.

The required discharge being 1,393 cubic feet per second, we have—

| Cubic feet per second. | Cubic feet per second. |
|---|---|
| 1393 / 62 | = 22·47 = 1,348 per running foot of overfall. |

Assuming the velocity of approach to be two feet per second, we have by Beardmore's tables a depth of 3·37 feet of depth of overfall required to vent 1,348 cubic feet per minute per lineal foot per running foot of overfall. Then—

| | | |
|---|---|---|
| Lip of weir being - | 325·72 + datum. | |
| | 3·37 | |
| Total - - | 329·09 | full discharge level of water at lock No. 1. |
| Level of canal bed - | 322,80 | |
| Leaves - - - | 6·29 | depth of water. |

passing down the Arrah canal at the end of the first reach, just above lock No. 1. Assuming that when the weir is discharging 1,393 cubic feet per second under a depth 3·37 feet with water surface at 329·09 + datum, the surface inclination of the canal is uniform up to its offtake from the main western, and that the water surface then is 332·00. What is the discharging power of the canal under such condition of depth and surface fall?

The surface inclination will be $\frac{332-329\cdot09}{5\cdot74 \text{ miles.}} = \frac{2\cdot91}{\cdot74} = 0\cdot507$ foot, or say 6 inches per mile,

| | Feet. | Square feet. |
|---|---|---|
| The depth just above the lock will be - - - - | 6·29 + area | = 620 |
| The depth at 3 miles 2,100 feet below the bifurcation, where the level portion of the bed terminates - - - | 7·00 + ,, | = 700 |
| The depth at 1 mile 3,690 feet below the bifurcation - - | 7·61 + ,, | = 770 |

and the discharges under these different depths with six inches per mile surface fall will be 1,148, 1,393, and 1,610 cubic feet per second calculated by Bazin's formula. The mean of these discharges is 1,348 cubic feet per second, and it seems probable that fully this amount passes down the canal when the level of the water surface at the bifurcation stands at 332·00, because the largest calculated volume of discharge is found in the upper part of canal. It is probable that in the upper 3¼ miles, where the bed is level, the surface slope is less than six inches a mile, and that in the last 2½ miles the inclination is somewhat greater. If these figures, however, are any accurate measure of the actual working of the canal, they result in this that, with six inches less than the full depth at the offtake, the Arrah canal, as constructed, can really carry the full 1,393 cubic feet per second it was designed to carry; and I am of opinion that the reported short discharge is only relative, and due not to any incompleteness in the work, but to the heavy losses by absorption, &c., to which this canal is still subject. As shown in this office No. 1348 of the 14th instant, the Executive Engineer calculates that he loses 50 cubic feet per second in the first 11½ miles. But while I believe that as much water enters the canal head as was (according to table of works) designed to enter it, I think an increased volume would be highly advantageous.

The proper place for a regulator seems to be in the main western canal, immediately below the offtake of the Buxar lock. In this position complete command of the available supply of water could be maintained for the benefit of both the Arrah and Buxar canals. The distance of the first locks and regulating weirs on the canals from the Dehree entrance lock are 10¼ miles and 14 miles respectively, but whether, in the present state of the works, such a regulation in the main western canal is necessary depends on the relative importance of the following considerations:—

1*st*.—The cost of the proposed regulator, or any other modification of the main western canal, by which the desired end (viz. giving the Arrah canal its maximum supply) can be secured;

2*nd*.—The degree to which irrigation receipts of the Arrah canal are likely to be lessened for want of a regulator in the main western canal;

3*rd*.—The effect of a regulator on the main western canal built *without* a lock on the navigation receipts.

After throwing off the Arrah and branch canals, and the Sulyea and Seeanwunk distributaries direct, the main western canal carries forward a discharge of 1,661 cubic feet per second thus—

| | | | Cubic feet per second. |
|---|---|---|---|
| Main western canal allowed discharge - | | | 4,342 |
| Arrah canal allowed discharge - | 1,393 | | |
| Buxar ,, ,, ,, - - | 1,226 | | |
| | 2,619 | | |
| Sulyea distributary - - | 13 | | |
| Seeanwunk - - | 49 | | |
| | 62 | | |
| | | | 2,681 |
| | Total - | | 1,661 |

This amount at least would have to be carried by a regulating weir placed immediately below the offtake of the Buxar canal, should there be any likelihood of the canal being extended to the Kurrumnassa; but not more than 610 cubic feet per second would be required for the supply of the distributaries between the Buxar canal and the Roodra nullah.

| | Rs. |
|---|---|
| (1) A weir to carry 1,660 cubic feet per second would cost, including earthwork, almost - | 18,000 |
| (2) A weir to carry 610 cubic feet per second would cost, including earthwork, almost - | 11,500 |
| (3) On the supposition that the canal will not be extended, and that in place of constructing a regulating weir below the Buxar lock, the embankments of the canal are raised from 334·00 to 336·25 + datum, and strengthened from the 12th mile to 21⅝th mile, so as to take pressure of from eight to ten feet, the cost will probably be - | 40,000 |

I have shown that, even under existing conditions, and supposing there is no waste from absorption and evaporation, the Arrah canal can carry 1,384 cubic feet per second. But this may not prove sufficient, and it was found even during last kharif season that there was a difficulty in sending water down to the ends of some of the distributaries. The canal should therefore at its head be capable of carrying the full quantity which the regulating weir No. 1 is calculated to vent, viz. 1,588 cubic feet per second, *plus* the calculated discharge taken off by the three distributaries above the weirs = 113 cubic feet per second, *plus* the loss due to soakage, &c., calculated at 100 cubic feet per second. The sum of these discharges equal 1,800 cubic feet per second. An additional depth of 13½ inches in the canal at its head, by which the water surface would then be raised to 333·62 + datum, would give this volume, which might be passed by the canal with safety at a pinch. The difference between 1,800 and 1,393 acres = say 400 cubic feet per second, at 133 acres per cubic foot, is 53,200 acres, and this at Rs. 2½ per acre, gives Rs. 1,33,000.

This is no doubt an extreme way of putting the matter, especially as such a general demand for irrigation almost necessarily presupposes such a state of matters that not more than 50 or 60 acres could be irrigated by each cubic foot. A better way of putting it perhaps is, that, as a matter of fact, when 1,393 cubic feet per second are entering the canal, and this is the utmost that can now enter it, not more than 1,230 cubic feet flow over the No. 1 regulating weir, and if 1,547 cubic feet are required for irrigation beyond (as shown in the table of works of the Arrah canal), then a regulator at 12½ miles of the main western canal might have the effect of giving 300 cubic feet per second additional at lock No. 1 of the Arrah canal and it might easily happen that such an extra discharge might mean a large increase of revenue, even during the kharif season, to the canal. At 50 acres per cubic foot the area would be 15,000 acres, which, at Rs. 2½ per acre, would yield Rs. 37,500.

If a regulator be built in the main west canal immediately below the head of the Buxar canal, the present available length of navigation would be diminished by 9⅜ miles, and the important town of Sasseram would not be so well situated as it is at present in respect to facilities for canal navigation. Taking the present average tollage per mile of navigable canal open at Rs. 230, the loss per annum in toll receipts may be taken at 9⅜ × 230 = say Rs. 2,200 per annum. This amount capitalized at 4½ per cent. gives Rs. 48,800, and the toll returns are sure to increase whenever the Buxar canal is open to the Ganges. There would therefore be

good grounds for keeping the main western canal navigation, such as it is, uninterrupted, and for incurring some expenditure to maintain it so, if necessary. I am therefore in favour of strengthening the banks of the main western canal between the 12th mile and its terminus at the trunk road, as by this means the navigation will be in no way interfered with and as much water as can be utilised may thereby be thrown into the Arrah and Buxar canals and the Gurra Chowbey distributary. I have, in giving Rs. 40,000 as the probable cost of raising and strengthening the main western canal banks, put down a larger sum than an estimate worked in detail would likely amount to. But as the plan indicated seems the most feasible way of securing two important ends, without in any way interfering with the future extension of the main western canal, on whatever principle it may be carried out, I would respectfully ask the orders of Government on the subject.

The next points on which I have been directed to report are the following :—

(*a*) The question of the system of compulsory application for water (paragraph 10 of Committee's report) ;
(*b*) The completion of the cadastral survey (paragraph 12 of Committee's report) ;
(*c*) Appointment of headmen (paragraph 13 of report) ;
(*d*) The contract system for irrigating blocks of land, and the record of irrigation from canals (paragraphs 14 to 16) ;
(*e*) The appointment of a Native Deputy Magistrate.

As I have been directed to report on the above subjects in consultation with the Commissioner, I have, for the sake of convenience, given my own views in half-margin, and against them the opinions of the Commissioner, when received, may be recorded. I am expecting the Commissioner's replies daily.

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## Appendix D.

In paragraph 9 of the Committee's Report on the irrigation system of the Sone Canals, they place at the head of the "chief" administrative difficulties on these canals *the system of previous application for water.*

Sections 74 and 75 (Part VI.) of Act III. of 1876 provide that no person shall be liable to pay any rate or due whatever, on account of water supplied to his land with the permission of the canal officers otherwise than on such application, nor shall water be supplied otherwise than on such application.

The Committee remark: "It is believed that this "provision was made in the interest of the ryot, and "to prevent his being charged for water supplied to "him, perhaps against his will, or at least unasked "for."

As the Canal Act only received the assent of the Lieutenant-Governor and the 22nd December 1875, and as the first year of regular irrigation from these canals was the year 1875–76, it is clear that the clauses, so objectionable in the eyes of the Committee, were not inserted in the Act on the strength of any experienced necessity for such provision. As these canals at least, on grounds sited by the Committee, clauses 74 and 75 of the Act, were due, I suspect, to defects in the early management of irrigation in Orissa, where in 1870–71 the ryots were to some extent worried by ill-judged assessments for water which all knew they received and benefited by, but which none could prove they ever applied for. But the deficiencies in this respect which the revenue system (such as it then was) in Orissa then laboured under were quickly remedied, and I may say had entirely disappeared at the time of the passing of the Act. Indeed, so far from the provisions of clauses 74 and 75 being held to be a safeguard to the ryot, they were looked upon rather as ensuring to Government at least some portion of its demands, for if a ryot irrigated 50 acres on the strength of a written application for 25 acres, Government could at any rate enforce payment for the latter portion, even though the ryot should subsequently become recusant and repudiate his liability in respect to the other 25 acres.

But neither as a means of securing Government nor the ryots in their respective rights does the compulsory application appear to be favoured by the Revenue or the Canal Officers, as the committee wind up their remarks on this part of our revenue system in the following words :—

"The Revenue and Canal Officers, as well as the native gentlemen we consulted, all dwelt on the drawbacks of this application system, and we earnestly recommend its abolition."

It may be noted that at present in a large proportion of cases payments are not made or rates levied on the applications, but on *measurements*, and unless complaints are made, the data afforded by the measurements are not even compared in detail with the applications. In some instances certainly it has been made on ground for remission in the complaints presented that no application was made, but this statement was only brought forward as evidence that no water was actually taken. There has been no attempt, that I am aware of, to admit receipt of water, but at the same time to repudiate liability on the mere legal plea of "no application ever given." The only value indeed that the enforced applications seem to possess is that they afford a sort of rough guarantee that the village channels shall be in tolerable order, as, unless an application is for water for a registered channel, the "permit" is not granted till the channel has been examined by an ameen or sub-overseer. The knowledge that the application is followed up by an examination of the channel and that the "permit" is conditional on the result of such examination is tending, I am told by the Executive Engineer, Arrah Division, to improve the channels.

As matters stand, the canal officers are so far bound by the application system that no "permit" is granted except on a written application, and no permission is given to any person who has not so applied to take water. If water be otherwise taken by any person, headman or ryot, he does so at his own risk. I am informed that the villagers consider it a hardship that they have often to make long journeys after they have managed to get the application written out before the requisite "permit" is obtained, and the Executive Engineer, Eastern Sone Division, is of opinion that rather than incur the preliminary trouble for obtaining irrigation the ryots are at times content to go without it. I do not suppose this to be a common case, but, as far as it has such an effect, the application in its present obligatory form is decidedly objectionable.

The Executive Engineer, Arrah Division, is of opinion that every owner of village channel (registered) should be allowed to take water without application, and that the application for registration of a village channel should in fact be an application for water when required, and this, in time, will doubtless be the method by which all villagers will obtain their supply. At present a properly constructed village channel is comparatively seldom met with, except on the estate of Messrs. Burrows, Thomson, and Mylne, where many village and field channels are constructed in a way that leaves little to be desired. These channels are excellent examples to the surrounding villagers of the sort of water ducts that are wanted.

The weak point in the application system, however, is that in case of a serious failure of rain it must be entirely broken through and become a dead letter, or else these irrigation works must, for the sake of a formula, be brought into the greatest discredit among the people and the risk run of a whole season's crops being lost. Should continued deceitful appearance of rain withhold the ryots from applying for water, an awkward rush might be made for permits, which no amount of establishment at the disposal of the sub-divisional officers could satisfy, and the only result would be that either sections 74 and 75 of the Act have to be ignored, or a great disaster be brought upon the canals as well as the country.

I agree, therefore, in thinking with the Committee that the application should certainly be abolished ; but as recommended by the Executive Engineer, Arrah Division, whose zeal in the work and already well-proved capacity for revenue management entitle his opinion to consideration, I think it may be politic not to repeal sections 74 and 75 for a year or two, by which time village channels will have become more general, and the necessity for keeping them in proper order will be better understood.

J. P. H. Walker,
Superintending Engineer,
The 3rd May 1879. Orissa Circle.

---

*Extract from a Note by the Commissioner of Patna, submitted with his letter No. 540 P., dated the 7th May 1879.*

With regard to the question of the system of compulsory application for water, the Commission remark

that the present system is a source of annoyance to the ryots, and that "the Revenue and Canal Officers, as "as well as the native gentlemen we consulted, all "dwelt on the drawbacks of this application system, "and we earnestly recommended its abolition."

Mr. Edgar, who was consulted by me in this matter, writes thus on this question :—

"I think the Irrigation Committee have to some extent misunderstood the remarks made by native gentlemen and myself on the present working of the system of applications. We did not so much complain of the mere fact of application being necessary, as of the great delay that almost invariably takes place between the application being presented and the water being given. If a man got his permit for water immediately on presenting the application there would be little complaint, but at present, when the application is made, the sectional officers are called upon to report whether the applicant's village channel is in order, and until a satisfactory report is received no water is given."

Mr. Edgar thinks, and I agree, that this application system cannot possibly be done away with before we have registered village channels, and he would not advise any change in the law for the present. The Committee say that in the North-Western Provinces village channels are not registered; that the canal officers look mainly to the outlet, letting people do as much as they like about the channels, and fining them if water is wasted.

I agree with Mr. Edgar in thinking that the system we are trying to introduce here is much preferable to this; and think that eventually it will be more popular with the people of Shahabad.

The Superintending Engineer considers the present system of compulsory application "as decidedly objectionable." The worst feature in this system is, he justly remarks, "that in a case of serious failure of "rain, it must be entirely broken through and become "a dead letter, or else these irrigation works must, for "the sake of a formula, be brought into the greatest "discredit among the people, and the risk run of a "whole season's crops being lost." He adds that "should continued deceitful appearance of rain withhold the ryots from applying for water, an awkward "rush might be made for permits, which no amount of "establishment at the disposal of the sub-divisional "officer could satisfy, and the only result would be "that either sections 74 and 75 of the Act have to be "ignored, or a great disaster be brought upon the canals "as well as the country."

These remarks, practical and logical as they are, are entitled to considerable weight.

As a matter of fact, these applications are for practical purposes of very little use, as will appear from the following extract from the Superintending Engineer's report :—

"It may be noted that at present in a large proportion of cases payments are not made, or rates levied on the *applications*, but on *measurements*; and unless complaints are made, the data afforded by the measurements are *not even compared* in detail with the applications."

Mr. Walker is, under these circumstances, of opinion that the application system should be abolished. He however, thinks that "It may be politic not to repea "sections 74 and 75 (of the Irrigation Act) for a year or "two, by which time village channels will have become "more general, and the necessity for keeping them in "proper order will be better understood." In this opinion I concur. The law need not, however, be repealed, as it admits of the interpretation put on it by the Commission. I would, as the Commission have done, interpret sections 74 and 75 as requiring an application for water to be made *not crop after crop, but once for all*, until such time as the ryot chose to withdraw it. I may, however, note that the provisions contained in these two sections are novel. The Northern Canal and Drainage Act (Act VII. of 1873), on the basis of which the Bengal Irrigation Act was framed, does not contain such provision. The difficulty which is now experienced was anticipated when these provisions were embodied in the Act, as will be evident from the following extract from the speech made by Mr. Dampier in presenting the original Bill before the Bengal Council :—

"In Part III. it was provided that the written contracts should be absolutely necessary. There had been much discussion upon the point, and departmental officers apprehended difficulty from this condition. But the Government were willing, in *deference to what was understood to be the wish* of the people, to *accept* the *inconvenience*, and to insist that written contracts should be taken before any person was held answerable for the payment of rates upon the water which was supplied with the consent of the canal officer."

Experience, however, shows that what was specially enacted for the convenience of the people has proved to be a source of annoyance to them.

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# REPORT

OF THE

# INDIAN FAMINE COMMISSION.

Vol
2

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CLASS

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# THE BENGAL FAMINE OF 1769–70.

[Compiled from Sir G. Campbell's memoir printed as "Part IV. of Report on the Famine in Bengal and Orissa;" Nagpore, 1867; and quoted here, from the reprint in Mr. Geddes' "Administrative Experience of former Famines," as "C": also from Mr. Hunter's letter, dated 10th September 1876, to Sir G. Campbell, printed in "Extracts from Records in the India Office relating to Famines in India from 1769 to 1788," Calcutta, 1868, referred to here as "H."]

1. *Antecedents of the Famine.*—The season of 1768 had been a bad one in Behar, where there had been floods in August, and no rain after the middle of that month, and large abatements of revenue were sanctioned;[1] but the failure does not seem to have been general throughout Bengal, and the revenue of the year 1768–69 was up to or above the average.[2] The early rains of 1769 were deficient, and on 28th July the Resident at Behar reported that the grain sown was entirely spoilt. A few days after, heavy showers revived the hopes of the people, but they soon ceased and no more rain fell: the consequence was that the early rain crop was poor,[3] the great rice crop almost a total failure, and the spring crops also were extremely scanty.

2. *Extent and history of the Famine.*[4]—This failure extended over the whole of Behar, Northern and Central Bengal, and in some degree to Dacca and to Eastern Bengal, except Chittagong and Backerganj. In August 1769, the Government wanted to send two shiploads of rice to the assistance of Madras, but could not obtain them. In October 1769 very gloomy reports were received from Behar and North Bengal: rice was selling at 10 seers at Patna, and "in all the districts north of Nadiya the crops will "be very short indeed." In November the Collector General "saw an alarming pros- "pect of the province becoming desolate," and the Government wrote home (23rd November) to the Court of Directors in the most alarming terms. They resolved to lay up a six months' store of grain for their troops, and sent in December to Dacca and Backerganj to purchase rice for Behar. In January they announced remissions of revenue to the farmers, "taking care they should also extend it to the ryots." In the spring of 1770 the distress was acutest in Behar: efforts were made, not very successfully, to obtain grain from the British Officers at Allahabad and Fyzabad; but it is probable that private trade[5] was active, and that the early rains of June 1770 restored confidence to the people, for the distress in Behar clearly abated about this time. But in Central and Southern Bengal the period of greatest intensity was from June to September. On the 18th June rice was at six or seven seers in Murshidabad, and for several days there was not a grain to be purchased: on the 12th July rice was only three seers per rupee, and the supply was not sufficient for the demand, even at this exorbitant rate: the Council wrote to Madras to ask for supplies from thence. Floods destroyed the crops in low-lands, and in August the famine continued with unabated severity; in September affairs improved as the early crops approached maturity, and in October things were so much brighter that a cargo of rice brought from Madras was sold at a loss. In December a plentiful rice-crop had been reaped and the famine was completely over.

3. *Measures taken by Government.*—The measures taken by Government to relieve distress seem, compared with modern ideas, to have been very insufficient. Besides the remission of revenue and the efforts to import rice from Eastern Bengal, from Oudh and Allahabad, and from Madras, which have been mentioned, they issued a proclamation (date unknown) against "hoarding and buying up grain,"[6] and they laid an embargo on

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[1] C. p. 411. See also his note, November 25, 1873 (pp. 57-60 of Famine Blue-book of 1873–74)—"There was already serious distress in Behar early in 1769, and severe famine in July and August of that year."

[2] H. p. 195.

[3] Mr. Hunter, p. 189, thinks the early rain-crop was an average one, inferring this from the fact that in a Despatch, dated 25th September, no mention is made of any failure in Bengal, only in Madras. But he does not seem to have known of the letter, dated 28th July, quoted by Sir G. Campbell, and it is in Behar that the early or Bhadoi crop is most important.

[4] C. p. 412.

[5] C. p. 417.

[6] H. page 19.. Mr. Hunter attributes much greater effect to this order (see page 196) than Sir G. Campbell, who says "there was some interference with free-trade, contrary to modern economical laws, but not to any very great or very injurious effect," page 421.

exportation, which was taken off on the 14th November 1770. In Patna, Rs. 50 worth of rice a day was distributed in December 1769 by the Resident at Patna; and on 16th March this had risen to Rs. 330 a day; in Murshidabad town rice was distributed daily in February in six places at the rate of half a seer to each person; in April Rs. 50 a day were distributed in Calcutta, and Rs. 25 in Burdwan. The cost of Backerganj rice imported into Murshidabad was Rs. 1,24,506.[1] These figures would indicate an expenditure of about three lakhs of rupees. Making allowance for other similar unrecorded disbursements, the expenditure can hardly be estimated at more than five lakhs of rupees. The loss of revenue is shown by the following statement of collections:—[2]

| | Rs. |
|---|---|
| 1768–69 | 1,52,54,857 |
| 1769–70 | 1,34,49,148[3] |
| 1770–71 | 1,40,06,030 |
| 1771–72 | 1,57,26,577[4] |

Compared with the receipts of 1768–69, the decrease of the two years 1769–71 was 30½ lakhs of rupees, which, added to the estimated direct expenditure, gives the total cost of the famine to Government as 35 lakhs of rupees.

4. *Effects of the Famine.*—The loss to the country in material wealth cannot be calculated; the loss of life is believed to have been greater than has occurred in any subsequent or historical famine.[5] In the north of Purneah the European supervisors believed that half the ryots were dead; the Resident of Behar calculated the famine mortality at 200,000 in May; the Resident of Murshidabad in June estimated that by that time three-eighths of the population of the Province had died; in July 500 died daily in that town; in Birbhum "many hundreds of villages are entirely depopulated, "and even in the large towns not a fourth of the houses are inhabited." In this large district in 1765 there had been close on 6,000 villages under cultivation; three years after the famine there were little more than 4,500.[6] The estimate made by the Council in November 1772, and officially reported after its members had made circuits through the country in order to ascertain the state of things accurately, was that one-third of the population had died, and this, as Mr. Hunter remarks, implies the death of about 10 millions, as the whole population of Bengal in those days can hardly be estimated at less than 30 millions. Such figures can be only vague approximations, since the information possessed at the time was so imperfect; and if as many as a third really died over the whole Province, the death-rate in the parts most affected must have been much higher, seeing that Eastern Bengal escaped much more lightly, and in Behar the visitation was soon over. But that the mortality was extremely great, there can be no doubt; and its effects were visible for many years afterwards[7] in the lowered revenues, the immense untilled area, and the competition that arose among land-holders to induce cultivators to settle on their estates.

## EARLY FAMINES IN THE MADRAS PRESIDENCY.

The following sketch is based on Mr. Dalyell's Report on the Madras Famines (quoted as "D.") and on the replies received from the Board of Revenue, and (to some extent) the Collectors of Districts, to the questions put by the Famine Commission.

1. *Famine of* 1729–33.[8]—Severe scarcity began in 1729 and culminated in this year. No mention is made of rainfall, but the scarcity is said to be due to neglect of tanks. At this time rice at 25 seers was thought a moderate price (previously 50 seers having

[1] C. pp. 413, 414, 415 and 417. C. p. 421.
[2] C. p. 420. [3] H. p. 195. Rs. 1,31,49,148. [4] H. *ib.* Rs. 1,53,33,660.
[5] C. pp. 416, 417, 418 and 420. [6] H. p. 194.
[7] Sir G. Campbell (in the Note of 25th November 1873 already quoted, page 59) says:—"Severe and "terrible as was the famine of 1770 in its immediate effects, it has been very much exaggerated in the statements "which have gone down as popular history, representing great part of Bengal as having then relapsed to a "state of jungle from which it did not recover for generations. So far from this being the case, the land-"revenue of 1771 was actually higher than it had ever been before, and continued to prosper and increase." But it is on record that this year's revenue was collected by measures of unusual severity; and a few years later Warren Hastings introduced his system of direct administration, and the revenue thus collected could no longer be compared with that realised under the former system. (H., p. 195). The account given by Mr. Hunter of the rise of the class of "vagrant cultivators" seems to bear strong evidence to the dreadful depopulation of the country.
[8] D. p. 10.

been common), but in 1733 it sold at 17 seers per rupee. The scarcity lasted several years. In 1729 the Government fixed the prices of rice and ragi, but had to cancel the order directly after, as it was feared that no grain would be imported. In 1730 a Committee was appointed to superintend the sale of grain: no one was allowed to retain more than 21 tons under a penalty, and the price was fixed at 24 seers per rupee.

2. *Famine of* 1781–2.[1]—This scarcity was mainly due to the war with Hyder Ali and his devastation of the surrounding country, and it ended in the spring of 1783, when, after Hyder Ali's death, the principal scene of combat was at a distance from Madras. Early in 1781 all import duties were remitted: in May a grain committee was appointed to fix the price of grain and to limit the quantity to be sold daily. On the 6th July they reported that only two days' supplies remained, but that much was concealed in the town. On this all restrictions on sales were removed, but Government sold 400 bags of rice daily. Crowds of residents from the neighbouring districts were driven in to take refuge in Madras from the ravages of the contending armies. In January 1782 people were dying in the streets.[2] Public subscriptions were collected, and a poor-house was founded, which afterwards became the Monegar Choultry. In May, 4,000 were being fed. In September and October, 9,000 were deported in parties of 1,000 at a time to Ganjam and Vizagapatam, where they were provided with employment.[3] In October Government fixed a price (9 seers per rupee for Bengal rice) and bought all imported rice at that rate, but soon had to raise its rate to 7 seers per rupee, till 20th December 1782, after which the rate was reduced to the old one. In July 1783 Government found themselves in possession of a great quantity of rice which was not wanted, and sold it at about 10½ seers, assuming for the purpose a monopoly of retail sale, and ordering all "boutiques for the sale of retail rice belonging to individuals" to be shut up.[4]

3. *Famine of* 1790–92.[5]—From November 1790 to December 1792, scarcity affected the Northern Districts, Ganjam, Vizagapatam, and Masulipatam. The cause is not stated, but the prices were very high, rising to 6 seers per rupee in Masulipatam and 12 in Ganjam. Export from Tanjore was forbidden, except to these Districts, and rice was imported from Bengal by Government. Some 2,000 of the poor were employed on local works[6] in Ganjam, and paid in grain from Government stores; subscriptions also were collected for relief, besides which from 200 to 300 rupees a month were spent by Government in providing cooked food for the infirm in that District, and 50 bags of rice were distributed monthly in charity by Government in Vizagapatam. Numerous deaths from starvation were reported from Masulipatam and 1,200 from Vizagapatam.

4. *Scarcity of* 1799.[7]—Dindigul. Scarcity being apprehended the Collector was authorised to buy Government grain to resell to the people below cost price, in order to lower the price of grain. Nothing further is known of this, and apparently the alarm passed off, without the necessity for any measures on a large scale.

5. *Famine of* 1805–7 [8]—Previous to the general failure which took place in 1805, there had been at the end of 1804 an alarm of scarcity in the Tanjore District, where, in spite of the protection afforded by the canal-system, the collector laid in a small stock of grain for retail sale, and early in 1805 requests came up from this district and South Arcot that grain might be imported by Government and an embargo laid on export. In 1805 there seems to have been a wide-spread failure of the crops, though no records exist to indicate with precision over what extent or in what degree and what months the

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[1] D. p. 12–17.

[2] Conf. Mill's History of India, V, 256 "Famine now raged in all its horrors," (October 1782, after a violent storm had sunk the grain-vessels in the harbour). "The bodies those who expired in the streets, or "the houses, without any one to inter them, were daily collected and piled in carts, to be buried in large "trenches out of the town, to the number for several weeks of not less, it is said, than 12 or 15 hundred "a week."

[3] The letter of the Relief Committee to Government gives no reason for this deportation except that "the "Committee have found it utterly impracticable to procure subsistence for them any longer" in the Madras Settlement. It is not said that they came from the northern districts. The recommendation was that they should be sent to Masulipatam *vid* Pulicat and Nellore, being cared for on the way. The Resolution of Government sanctioning the step directs that the several zamindars "should be written to assign places of "settlement for the poor in the villages of their districts, with orders that they should be subsisted at the "Company's expense as economically as possible, until they shall be able to gain a livelihood by their bodily "labour."

[4] The great famine in Upper India was then beginning to rage, from the Indus to the Karamnasa. The Bengal Government, which had supplied large quantities of rice to Madras, began to grow alarmed in October 1783 and stopped all export, except to Madras, in December. In January 1784, as Madras still required supplies, some rice was imported from Batavia.

[5] D. p. 17, 18.

[6] First mention of relief-works.

[7] D. p. 18–19.

[8] D. pp. 19–26.

rainfall was deficient. After some discussion the Government decided that the correct principle to follow was to avoid, as far as possible, any interference with the trade, not to fix prices, nor import grain to sell to the public, nor prohibit exportation from any part, to provide employment for the able-bodied on public works, and to pay them in cash, except so far as it might be more economical to pay in grain if the Government storehouses were full. Mr. Dalyell's history tells us nothing as to the progress of the famine or the relief measures in 1805 and 1806; but in 1807 the distress still continued, and had become more severe. In December 1806 the proposal to open relief-works to employ the able-bodied was approved, but the collectors were warned not to impose too heavy a burden on the Treasury. The Government in January 1807 undertook to pay a fixed price (between 11 and 12 seers per rupee) for all grain imported into Madras up to October, by which time, owing, it may be presumed, to an abundant south-west monsoon, the scarcity was over. The distress was most severely felt near Madras, in the Districts of Nellore, North Arcot and Chingleput; it extended also to Cuddapah, Karnul, Bellary, South Arcot, and Tanjore; and in September it was suddenly found to be seriously pressing on the people of Trichinopoly. In the ceded districts (Cuddapah, Bellary, and Karnul) Sir T. Munro, who was then collector, opposed interference with trade and advocated relief being given to the people near their homes on useful works, such as tanks and wells, in order to save them the expense of a long journey, and also to avoid the risk of disease following on large aggregations of people. In some districts considerable sums were spent on sinking wells. Government contemplated the establishment of grain depôts where the distress was greatest; but the step was delayed till the mortality among the cattle made it difficult. Large numbers of paupers crowded into Madras,[1] attracted it would seem by the fame of the "Monegar Choultry," or permanent poor-house, and in August upwards of 15,000 were fed gratuitously, the money being provided by public subscriptions. The number of deaths was reported to be very large. In September and October large numbers of these wanderers were deported to their homes after receiving food for the journey; but no statistics exist, except for the town of Madras itself, where the excess mortality of 1807 was registered at about 12,000. When the famine came to an end, the Government found themselves with a large stock of grain in their hands which they were obliged to part with at a loss of 10 per cent. on the cost price. Two years after, the Court of Directors, discussing the principles which had been laid down in 1805 but not followed, held that the rule of non-interference, though sound in the main, could not always be adhered to, and instanced with approval the procedure in Bengal in 1783, when a committee was appointed to fix the price at which grain might be sold, and to compel persons having large stocks to dispose of them.

6. *Collection of Land Revenue.*—In January 1807 the principle was laid down that the land revenue should be collected with great moderation. In permanently settled districts the zamindars should get suspensions. But "our primary care should be the "preservation of the real resources and riches of the country, *i.e.*, the population; the "realisation of the ordinary revenues, however desirable, is quite a secondary matter."

7. *Sir T. Munro's views on Relief Measures.*—The following extracts from Sir T. Munro's letter of the 8th February 1807 are of interest:—

* * * * * * * * * *

"Were Government to offer to the poor any other relief than that of the wages of labour, were it to issue grain to them either gratis or at a reduced price, it would only have the effect of increasing their number, of drawing them together from all quarters, and of encouraging them to abandon themselves to the protection of the public, and to neglect the salutary means of preserving themselves by their own exertions. In India, as well as in all other countries, the distribution of charity by Government will always be found to increase the number of the poor, which will always at least keep pace for the fund destined for their relief, whatever its amount may be. Were grain in this country to be issued to the poor at any particular station, the report would soon reach the remotest corners. The relief to be afforded would be greatly exaggerated, and the poor, who now procure a livelihood by their labour, would crowd in from all sides in the hopes of procuring it upon easier terms. It would soon become

[1] The Managing Committee wrote, in one of their reports, "the Governor-General in Council has observed "that the natural effect of any institution for the relief of the community in periods of scarcity is to collect "the poor in vast numbers together at the place at which the grain may be distributed. While we acknowledge "the justness of this observation, we may be permitted to remark that by a report received from the Nellore "District it would appear that of those whom the present unfavorable season had induced to change their "place of residence the greater part removed towards the north, to Masulipatam and Vizagapatam, while a "comparatively small number proceeded to Madras. Indeed, it will invariably happen in seasons like the "present that numbers of people deprived of their accustomed occupations and means of support will resort "from their villages to the more populous and opulent towns and settlements in the hope either of procuring "employment or a subsistence from public or individual bounty."

impossible to maintain such a multitude, and famine would appear among them ; but this is not the only evil which would attend their being drawn away from their own villages, for the loss of their labour would be felt, and the crops now on the ground, as well as the cultivation of the ensuing season, would suffer from want of hands.

The natives of India are probably as charitable as those of any other country, and the poor may be left to their care with more safety than to that of any public institution. As long as there is not an absolute famine, the poor are in little danger, for they will derive a subsistence either from private charity or from their own labour. Notwithstanding that the present season is beyond all comparison worse than any that has ever been known, I see no cause to apprehend a famine in the Ceded Districts. I cannot discover that such an event has ever happened in any former period, unless when war was added to an unfavourable season ; and from what I now see, I am convinced that the seasons alone, however adverse, can never in one year occasion a famine, and that there is no risk of the occurrence of two such bad years in succession as to produce this calamity ; for this would be supposing that to be probable which has never yet happened. 1212 and 1213 were the two worst successive years ever remembered, but they occasioned no famine. The produce of the country supported, not only its own population, but many thousands of emigrants from beyond the Toombudderah, besides a very great exportation to the Deccan continually urged on by the famine in that quarter at the close of the year 1213. Rice was at eight seers the rupee, or about one-third dearer than it is now ; but as even that high price, though it distressed the poorer sort of inhabitants, produced no famine, it may be confidently assumed that such a misfortune cannot take place until the price rises above what it was at that time. But it is likely that the price will continue nearly stationary until May or June ; should there be no rain in those months, it will rise, but not to such a degree as to induce a famine."

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" Were I to look only to the crops of the present year for the support of the inhabitants, I would have no doubt that a famine was rapidly approaching ; but having witnessed the unfavourable seasons of 1212 and 1213[1] pass away without occasioning any serious distress, and knowing that the subsistence of the people does not depend entirely upon the produce of one or even of two years, I contemplate the present scarcity with little alarm, so far as it regards the preservation of their lives. The Ceded Districts, from their remoteness from both monsoons, are more exposed to drought than the Carnatic, and the inhabitants are hence perhaps more accustomed to guard against the effects of dearth by laying up a supply of grain in plentiful years. Jowari, their principal food, may be kept good in pits from 10 to 20 years ; large quantities of it are laid up, not only by merchants, but by all the more substantial ryots, and are not brought out for sale unless in those years when prices are high. The dearth in their districts and the famine in the Deccan in 1213 exhausted nearly all the stock of former years ; but a great deal of that of 1214 and 1215 still remains on hand, and a considerable portion of it will be reserved till June in the hopes of obtaining a greater price, should the rains in that month fail. Almost all the lower class of ryots too, though they cannot afford to keep grain for a distant speculation, usually reserve enough to maintain themselves throughout the year. Such of this class as have had no crop this year will support themselves until next harvest by working as labourers ; those who have had some will provide for their own subsistence before they sell any to discharge their rent. The present season is worse than that of 1213 for the poor among the ryots, but not for the poor among the other classes, because the poor of other classes are only affected by the price of grain, which is not yet so high as in 1213 ; while the poorer of the ryots are affected chiefly by the failure of their crops, whatever the price may be. The high price in 1213 was occasioned as much by exportation as by the deficiency of produce ; that of the present year arises solely from the dearth. The poorer ryots in 1213 obtained a quarter, or half, of an ordinary crop, and did not suffer from the high price, but rather gained by it ; but in the present year many of them have had no crop at all, and though they will find means to maintain themselves, that object would be facilitated by giving them employment on tanks and other public works. I am confident that the Ceded Districts will easily support their own population during the present scarcity. They can be distressed only by exportation, and that to foreign territories may be stopped whenever it is deemed expedient ; but that to the Carnatic must depend on the circumstances of that province. It has ceased during the last two months, in consequence of the importation by sea, which, if it continue to produce the same effect, will be the most effectual mode of assisting these districts. As they can derive no supplies from other quarters, the price of grain, which is in all countries the best ground on which a judgment may be formed of the probability of a dearth or famine, must be peculiarly so in them, for it is more easy for the grain-dealers to calculate the stock in a country which can draw no supply from any other and to regulate their prices accordingly, than to estimate the quantity of grain in a country which can import that article by sea. If the price, therefore, is adopted as the measure of the stock of grain in the Ceded Districts, there can be no cause for alarm. The vast number of petty grain-dealers in Indian countries not only keep the price as low as it ought to be, by rendering combinations for raising it impracticable, but make that price a surer test of the quantity on hand, and expected from the crop, than it would be if the trade were limited to fewer persons. For though a few great speculators might be wrong in their calculations, it cannot be supposed that several thousand petty dealers, who do not upon an average supply above 20 families, should be so ignorant of the trade which they have followed all their lives as not to be able to calculate whether or not they could serve their customers until the harvest in October. If they were not satisfied that they could do so, or, what is the same thing, if a famine was to be expected before that period, rice would not now be sold at 12 seers the rupee."

8. *Scarcities in* 1811, 1812, and 1814.[2]—The season was unfavourable in some of the Southern Districts, and anticipations of famine were expressed. The principle that

[1] 1213 F = 1803 A.D.

[2] D., p. 26.

Government should avoid interference with trade was again and more strongly laid down, and duties on imports were removed. No serious distress, however, seems to have ensued, though some relief-works were opened in Canara in 1812, where the distress was due to the abnormal export which raised prices, and in Madura during the first five months of 1814. Some 42,000 persons were employed on relief works at a cost of Rs. 3,25,000.

9. *Famine of* 1823–4.[1]—It appears from the rain return that in Madras itself the south-west monsoon of 1823 was somewhat deficient, and the north-east monsoon still more so. The same deficiency must have extended to the northern districts; for in the autumn of that year the Resident at Masulipatam took the alarm, and in December the Government were satisfied that severe distress must follow unless rain fell in that month.[2] Prices had then begun to rise, and deaths from starvation were reported. The famine prevailed most in Bellary, Cuddapah, Karnul, Vizagapatam, Gantur, Nellore, North Arcot, South Arcot, Madras, and Salem. The measures adopted by Government were to forbid all interference with trade, to remove import duties, to offer a bounty of Rs. 7-8 per ton on all rice imported from Bengal or the Malabar Coast, to open relief works for those who needed employment, and to assist by grants-in-aid the private subscriptions collected in order to provided food for those unable to labour. Towards June and July 1824 the distress grew very severe; for the south-west monsoon again threatened to fail, the rain-fall from May to September being only 3·88 inches in Madras, or a third of that of the previous year. In North Arcot, rice sold in July at $4\frac{1}{2}$ seers per rupee; in Vizagapatam at nine seers. Several thousand people were fed for several months in Madras itself, to which place the famished people seem to have crowded as usual.[3] In the Chingleput district, 7,000 were fed for three months, and in Nellore 2,000. Deaths from starvation, in spite of these efforts, were reported to be of frequent occurrence. The later rains of 1824 were seasonable and abundant, prices began to fall rapidly in October, and by the close of the year distress was at an end.

10. *Effect of this famine on the Revenue.*—The effect of the drought of 1823 on the land revenue was noticeable. Taking the average of the four preceding years, the figures were—

| | Demand. | Collections. |
|---|---|---|
| | R. 332,95,000 | 333,06,500 |
| In 1823–4 they were - | 317,08,000 | 313,65,700 |
| Decrease - | 16,87,000 | 19,40,800 |

The whole of this decrease was not however due to the drought, for the assessments were largely reduced, on independent grounds, to the extent of about eight lakhs of rupees. The direct reduction due to the drought was in Bellary and Cuddapa, 25 per cent. on wet and 33 per cent. on dry lands; in North Arcot $12\frac{1}{2}$ per cent. on all lands. But in Tanjore, where the revenue varied with the price of produce, the assessment was increased by $7\frac{1}{2}$ lakhs as the result of the drought.

In 1834, the demand was Rs. 352,23,000, and the collections Rs. 354,51,000, an increase considerably above the average figures of the years before the famine, partly arising from the realization of arrears and partly from the high prices of produce. On the whole then the conclusion may be drawn that the loss to the revenue caused by the drought in 1832–3 was about nine lakhs of rupees, to which must be added a reduction of $2\frac{1}{2}$ lakhs in the transit duties; but this loss was more than recouped in the ensuing year.

11. *Famine of* 1832–3–4 (*the Gantur Famine*).[4]—This famine, though not of very wide extent, was more severe in one special tract than any other that had previously occurred under British rule; and it visited also the southern part of Hyderabad and the Deccan District of the Bombay Presidency. The early rains of 1832 (from May to

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[1] D., pp. 27–32.

[2] This is the first instance of a "famine forecast" having been prepared. The Board called on all collectors to report what proportion the crops of the year bore to an average crop, and to the neceesary consumption of the district for a year; what stock existed, and what prospect of external supplies; also to send weekly reports on the state of the season and the crops.

[3] The ration given must have been very small, for it only cost Re. 1 per head per mensem.

[4] D., pp. 32–43.

September) were rather deficient in Madras, and the north-east monsoon was almost wanting. The failure seems to have extended to all the Northern Districts except Ganjam; and in November 1832 the Government began to take the alarm. Import duties were removed and interference with trade forbidden. In January 1833, however, the Government wrote that from the reports received the scarcity seemed not to approximate to that felt in 1824, and that economy must be practised. But in April the prospects were darker, and the influx of starvelings into Madras had begun. Orders were issued to collectors, in order to keep the people in their own districts, to open useful relief works for the employment of the able-bodied, to distribute cooked food to the weak and infirm if absolutely necessary, but with a warning that this is a dangerous expedient, likely to attract numbers and so to aggravate distress, and that the measure must therefore be confined to the narrowest possible bounds, the food being boiled and the quantity given to each applicant restricted to the smallest portion calculated to afford sustenance. The police force was also strengthened in order to put down robberies. Imports of grain were stimulated by lowering the price of salt to exporters, and later on in August 1833 a bounty of Rs. 5 per ton on all imported grain was offered and was paid on about 12,700 tons. The distress was most acute in the Gantur district, so much so that the famine is known by the name of the Gantur Famine; it was also extremely severe in Cuddapah, Bellary, Nellore, Masulipatam, and North Arcot, and its effects extended in some degree to Rajamandry, South Arcot, Salem, Coimbatore, and Trichinopoly. As in previous famines the sufferers flocked into Madras; by May 1833 there were 12,000 immigrants from the Northern Districts fed in the town daily; in June 33,000 were fed and 7,000 employed on works; and in September 70,000 were being fed and 10,000 employed. Instructions were sent to the collectors to do all they could to prevent this emigration by giving employment on works, and, if necessary, gratuitous food to starving people near their homes, and steps were taken in Madras to deport wanderers to work in large parties of 3,000 and 4,000 on the Nellore road. The mortality was very great. Groups of people were seen dying in the streets of Madras. In April it was reported that large numbers had perished in Masulipatam. In Nellore in August "the roads were strewn with dead bodies," though 10,000 people were being fed in the town. It was afterwards estimated that in the Gantur district, out of a population of 500,000, 150,000 or 200,000 had died. This may perhaps be accounted for by the very moderate expenditure on relief measures. Putting aside the town of Madras itself only about three lakhs of rupees were spent in the outlying districts, of which one lakh of rupees were appropriated to Gantur and one to Nellore.[1]

12. *Continuation of distress in Gantur in* 1833–4.—The rains of 1833 were good, and the famine rapidly subsided as soon as the autumn harvest was got in; the import duties were resumed in February 1834, but distress lingered on in Gantur throughout the year, and the relief works were kept open till the end of 1834. In June 1834 upwards of 10,000 people were still employed, costing Rs. 22,000 per mensem, and Rs. 500 a month were spent on the distribution of food. The highest prices reached were at Vellore, where rice was sold in August 1833 at seven seers the rupee, a rate which provoked a riot. In Madras in April rice fetched $10\frac{1}{2}$ seers per rupee. The average price through the year was 14 seers per rupee (Rs. 354 per garce) in Gantur and 18 seers in Madras.

13. *Effect of famine on the revenue.*—There is a good deal of difficulty as to the actual loss of revenue caused by this famine. The report of the Public Works Commission (1852) states that from 1832 to 1850–51, in 18 years, there had been a loss of land revenue of Rs. 77,50,000; and that on inland custom, salt, motarpha, and excise there had been an annual loss of Rs. 1,02,784, or a total loss of Rs. 15,32,000. Assuming that the loss to the ryots bears to the loss of Government revenue the proportion of 60 to 40, the diminution in their profits from failure of crop would be 116 lakhs. The value of the sheep and cattle that perished was estimated at 18 lakhs. Thus the total loss caused by the famine has been estimated to amount up to $2\frac{1}{4}$ millions sterling. The Board of Revenue, however, state that the falling-off in the public receipts was partly due to other causes, and that the land revenue had recovered itself by 1837–38; and the following information has been derived from their office. The revenue had been steadily decreasing from causes independent of drought, the chief of which were the breakdown

[1] At the Masulipatam relief houses the daily meal served out was $\frac{3}{4}$ of a lb. and the monthly cost of each pauper was only 0-14-4. The collector adds, 10th May 1833, "I fear that numbers have perished for want; many of the applicants leave the relief house unsatisfied."

of the zamindari system, and the growing conviction that the ryotwari lands had been assessed too high. The yearly collections are thus shown :—

| | |
|---|---|
| 1825–26 | 337,85,000 |
| 1826–27 | 326,96,000 |
| 1827–28 | 321,19,800 |
| 1828–29 | 311,07,900 |
| 1829–30 | 310,33,100 |
| 1830–31 | 309,94,800 |
| Average | 313,13,900 |
| 1832–33 | 267,44,400 |
| Decrease | 45,69,500 |

In the following year the collections rose again, and surpassed the previous average :—

| | |
|---|---|
| 1833–34 | 316,03,000 |
| 1834–35 | 316,37,000 |
| 1835–36 | 313,37,000 |
| 1836–37 | 297,53,000 |
| 1837–38 | 326,31,000 |

The decrease in the land revenue, due to famine, may therefore be set down as about 45½ lakhs of rupees, and the injury done did not outlast the year. In effect, however, there was in 1832–33, a decrease of Rs. 1,81,000, in sea customs Rs. 1,41,000, in salt Rs. 3,26,000, in stamps Rs. 16,000; adding all these together, the total loss of income to the State amounted to about 52 lakhs of rupees.

14. *And on mortality.*—Dr. Cornish (Sanitary Commissioner, Madras) states[1] that when a census was taken in 1838 it was found that in eight districts affected by the famine of 1833 the population had decreased as compared with the census taken in 1822. Both these censuses were roughly taken, through the village authorities, but it may reasonably be held that, though not absolutely accurate, they possess considerable relative accuracy where they were taken over the same area and on the same system.

## HISTORY OF EARLY FAMINES IN THE BOMBAY PRESIDENCY.

The following note is compiled from Colonel Etheridge's official report, printed in 1868. He was deputed to collect what facts he could as to the past famines in the presidency; his report is based on the records of the Government secretariat, and on the information supplied him by the collectors of districts, who again based their letters on the records found in their own offices, and on the reports, recollections, and traditions collected by themselves and their subordinates from old and well informed residents. The references are mostly to the pages of his report, but a few facts have been collected from other sources; one of these, Mr. Mahdi Ali's Report on the Hyderabad famine of 1876–7, is quoted as "M.A."

1. *Earliest famines.*—The following is a list of the famines of past times, the memory of which is handed down by tradition, or is preserved in historical notices, but respecting which few or no details are known :—

1396, A.D.—[2] This is known as the Durga Devi famine, and is said to have lasted 12 years, and extended over the whole of Southern India south of the Nerbudda, which districts were entirely depopulated, and a very scanty revenue was obtained from the territory between the Godavery and the Kistna for upwards of 30 years.

1460, A.D.—[3] The famine of Damaji Pant. Remembered only in the Deccan.

1520, A.D.—[4] Mainly due to military disturbances in the Deccan.

1577, A.D.—[5] Only remembered in Kutch.

1629–30, A.D.—[6] This was a most severe famine, and raged throughout all the Deccan. For two successive years the rains failed, and the mortality and depopulation caused thereby were very great. The Emperor Shah Jahan was then at Burhanpur; and the "Mirat-i-Ahmedi" describes the measures he took for the relief of the distressed. He ordered poor-houses to be opened at Burhanpur, Surat, and Ahmedabad for the relief of the famished, and food and money to be distributed. All taxes were remitted for two years. The destruction of cattle was so great, that it is said that no male buffaloes were to be found in Ahmedabad after the famine, and they had to be imported.

[1] See "Influence of Famine on growth of population," page 7.
[2] Pages 85, 98, 99. See also Grant Duff's History of the Mahrattas, 1, 59.
[3] E., pages 99, 100. [4] E., page 100. [5] E., page 25.
[6] E., pages 39, 63. See also Elphinstone's History, page 507.

1650, A.D.—[1] A famine in Ahmedabad.

1659–60, A.D.—A great scarcity throughout India in the reign of Alamgir. (M.A.)

1685, A.D.—A drought, which nearly compelled Alamgir to abandon the siege of Golconda, through dearth of provisions. (M.A.)

1718, A.D.—[2] This prevailed in Ahmedabad and Surat; great mortality caused from famine and sickness. Bajri sold at two seers per rupee.[3]

1747, A.D.—[4] A very severe famine reported from Kutch, Ahmedabad, Rewa Kanta and Surat, as well as from Aurangabad and other parts of the Deccan (M.A.); according to the "Mirat-i-Ahmedi" not a drop of rain fell, nor blade of grass grew. There was much emigration into Malwa.

In 1757, 1766, 1774, 1782, A.D.—[5] Four minor famines or seasons of severe scarcity are reported to have occurred in Kutch; but no details are remembered concerning them.

2. *Famine of* 1791–92.—Of the famine of 1791–92 hardly any records exist; but according to the traditions and recollections of it which still existed in the minds of the people in 1867, it was the severest famine ever known, and it extended in greater or less degree to the whole of the Bombay Presidency except Sindh, and to Marwar. It seems to have been the culminating period[6] of a series of bad years, aggravated by disturbances[7] and war. The summer rains failed entirely in the Southern Mahratta Country[8], were very scanty in the Deccan and in Guzerat, in Katiawar[9] and Marwar, and were deficient in the districts along the coast from Broach and Surat to Ratnagiri. But in October rain fell abundantly, and the famine was ended by a good harvest in the spring of 1792. In the Southern Mahratta Country, as well as in the adjoining parts of Hyderabad (Kaladgi and Dharwar) it is still remembered[9] as the "Dogi Bara," or skull famine, from the vast number of the skulls of those who had perished from famine; and in all parts the mortality is believed to have been very high. From[10] the Deccan and Katiawar there was a great influx of emigrants into Broach and Surat; from[11] Ahmedabad and Kaika the people fled to Malwa, a fact which is noticed as a curious exception to the rule, since Malwa is generally less fertile than Guzerat, and suffers more from any seasonal calamity. Great numbers of the emigrants are said to have perished in Malwa, and[12] millions in Surat. Prices are said to have been[13] 8 Surat seers per rupee in Surat, 6 seers in Ahmednagar, 3 in Satara, 1½ in Dharwar and Raichor, 4½ in Hyderabad, and 3 in Gulbarga; but little reliance can be placed on such figures. By way of relief, large remissions of revenue were granted by the Native Governments; exportation was forbidden, and the prices at which grain might be sold in the markets were fixed. Rice was brought from Bengal to Bombay and the sea-ports north of it by private traders, and the relief measures which suggested themselves to the Sawant Wari[14] State were to waylay and plunder these ships, and distribute the grain to the distressed population.

3. *Famine of* 1802–03.—This famine appears to have been more widely extended, and to have caused severer distress, than any other that has been known in this country before 1876. Native opinion, however, reckons it to have been less severe in the Bombay Presidency than that of 1791–92. Its intensity was most felt in Khandesh, Ahmednagar, Sholapur, Kaladgi, and Dharwar, also in the southern part of Hyderabad, especially Raichor, and it pressed severely on Belgaum, Satara, Poona, Surat, and Kutch; elsewhere it was comparatively light. The famine was not, however, so much due to the irregularity of the season as to the ravages of war. The rainfall was indeed scanty in most parts, especially in the Concan districts and the southern Mahratta country and Hyderabad, and the crops under ordinary circumstances would have been below par; but it is expressly stated in the reports for the more northern part of the Deccan, such as Khandesh[15], Poona, Satara, Kaladgi, and Dharwar, as well as in Aurangabad, that the season was a fair one, and the harvest would have been good, or pretty good, but for the disturbed state of the country, which prevented much land from being sown, and for the destruction caused to the standing crops by the ravages of the army of Jaswant Rao Holkar and the Pindaris who followed in his train. One main alleviation[16] of the distress in these parts was the abundance of water in the tanks and rivers, and the plentiful supply of grass. In Khandesh[17], Ahmednagar, and Aurangabad, the traces of these ravages are said to have been in 1867 still visible in the ruins of deserted villages which have never been re-populated. In the parts which themselves were free from war,—the Concan districts, Bombay, Surat, Broach, and Guzerat—the distress was chiefly caused by the influx of starving people from the

[1] E., page 37. [2] E., pages 40, 63. [3] District Gazetteer, page 11.
[4] E., pages 26, 40, 53, 58, 64. [5] E., page 26. [6] E., page 162.
[7] E., pages 96, 98, 122. [8] E., page 100. [9] E., pages 104, 105.
[10] E., pages 55, 58. [11] E., pages 37, 38, 50. [12] E., page 65.
[13] E., pages 64, 78, 97, 105, and M.A. [14] E., page 122.
[15] E., pages 76, 80, 87, 97, 104, 107, and M.A. [16] E., page 80.
[17] E., pages 76, 80, and M.A.

Deccan and the Nizam's territory, who raised the prices, disturbed the country, and brought disease in their train. The mortality is said to have been very great. Lord Valentia[1] gives a vivid account of the numbers of dead and dying he saw at Panwel, near Bombay, where a special establishment was kept to bury the bodies, and it was estimated that in this one place 4,000 people had died in six months. In Khandesh[2] "vast numbers" are reported to have died or deserted their homes. In the town of Ahmednagar[3] alone (which now contains 34,174 inhabitants) 5,000 or 6,000 people, and in some parts of the district two-thirds of the rural population, are said to have perished. It was reported that 10,000 wanderers died at Wai[4] (in Satara), and 15,000 at Gokak[5] in Belgaum. Prices were enormously high. It was commonly reported among the old generation that grain sold at one[6] seer per rupee in Khandesh, Poona, and Satara, and at half or three-fourths of a seer in Admednagar and Sholapur; but the recorded price lists, where obtainable, do not bear this out. The highest prices of which there is documentary evidence were $9\frac{1}{2}$[7] seers per rupee in Bhuj (Kutch), [8]13 to 16 seers in Surat, [9]3 to $3\frac{1}{2}$ seers in Ahmednagar,[10] 4 to 6 seers in Ratnagiri.

4. The Government of Bombay,[11] under Mr. Jonathan Duncan, had little knowledge of what was going on up-country, but took active steps to relieve the distress which under their notice in their large towns and cantonments. In Bombay town import duties were suspended (rice was imported from Mangalore), exportation forbidden, and a Government store of grain laid in, out of which 200 bags were sold every day at Government shops at a fixed price. Relief-works were opened for the employment of the immigrants into Bombay; tanks and wells were deepened, and the road to Tanna[12] was repaired. In Surat great anxiety was felt about the effect of dearness of food on the temper of that turbulent town[13]; pressure was put on the villagers (who had reaped an excellent cold weather crop early in 1804) to import the grain into the city, and guards were stationed to prevent its export. The Peshwa's Government at Poona imported grain from the coast, and remitted revenue largely. Sir James Mackintosh stated in his address to the Grand Jury of Bombay, 1804, that the Government had imported or contracted for the import of 600,000 bags of rice, value 500,000*l*., and that private trade had brought in 400,000 bags more. But for this import he estimated that of the population of Bombay, Salsette, and Surat one-eighth or 50,000 would have died. In his Preliminary Discourse to the Literary Society of Bombay (26th November 1804), he said that the mortality began to increase in 1803, and was trebled in 1804. The Transactions of the Society give the figures, the population of Bombay being reckoned at 150,000.

| | | | | | |
|---|---|---|---|---|---|
| Deaths in | 1802 | - | - | - | 5,297 |
| „ | 1803 | - | - | - | 8,320 |
| „ | 1804 | - | - | - | 25,837 |
| „ | 1805 | - | - | - | 10,347 |
| „ | 1806 | - | - | - | 6,440 |
| „ | 1807 | - | - | - | 5,834 |

Of the refugees or immigrants from famine districts, 12,000 were employed on works in and round Bombay, besides a considerable number in Surat, and 1,400 were received in hospitals[14]. There was a very large emigration from Marwar to Guzerat, and it was noticed that these people, though they claimed charity, refused to do any work in return. They were diseased and emaciated, and the mortality among them was very great, scarcely one in a hundred living to return.[15]

5. *Famine of* 1812–13.—This famine was severely felt in Kutch[16] and Katiawar, especially in the western parts, and in Marwar; and it extended, though less acutely, to Ahmedabad[17], Kaira, and Baroda[18]; Surat and Broach only felt the rise of prices caused by the drawing away of grainand the influx of paupers. It did not, however, extend to Malwa, Sindh, or Khandesh, where the season was good and crops were abundant. No rain at all fell during the summer monsoon in Kutch or the west part of Katiawar: in Guzerat rain fell in July, then ceased for $1\frac{1}{2}$ months, and then returned in time to save the crop, though not to make it a good one. There is not much mention of mortality, except among the cattle of Kutch and Katiawar, where the grass was entirely dried up, but there was much emigration. In the Pahlanpur[19] State, it is said that whole villages were depopulated, many of which are still deserted, and in one sub-division of Katiawar[20]

[1] Travels II., 108–112. [2] E., page 76. [3] E., page 78.
[4] E., page 97. [5] E., page 103. [6] E., pages 76, 87, 97, 79, 98.
[7] Page 22. [8] Page 75. [9] Page 84.
[10] Page 118. [11] Pages 124, 125. [12] Page 116.
[13] Pages 72, 74. [14] Forbes's Oriental Memoirs, IV, 291–3.
[15] District Gazetteer, page 12. [16] Pages 23, 27, 36. [17] Pages 38, 50, 51.
[18] Pages 55, 61. [19] Page 32. [20] Page 36.

60 villages were entirely deserted, in another 45 out of 60. The people of Kutch and Katiawar countries emigrated largely to Sindh, where the Amirs employed them on a canal work: they also fled into Ahmedabad, Kaira, and Broach; and many of these immigrants died on the way. The preceding year had suffered from locusts, and stocks were low. Prices in Bhuj rose to 9 seers per rupee, when they were stopped by the local officials opening a grain shop where Government grain was sold at that price. In Pahlanpur the Dewan bought grain[1] at 5 seers, and sold it at 16 seers per rupee; in Ahmedabad[2] jowari and bajra fetched 8 seers per rupee, and ghi 1 seer.

6. *Relief Measures.*—The steps taken for relief show more activity than those previously recorded. In Bhuj[3] and Pahlanpur (native states) relief-works were opened, and in Bhaunagar[4] 10,000 people a day were fed by the Raja. In Baroda and the chief towns of Guzerat, charitable relief was largely given, the rich inhabitants co-operating with Government. The Bombay Government[5] were urged, especially by the Collector of Kaira, to prohibit export, and to buy up grain on account of Government in order to supply the troops, and also to re-sell at a moderate profit; but they refused to interfere in any way with trade, and the Governor recorded in a separate minute his adherence to the principles of political economy as expressed in *The Wealth of Nations*, and his conviction that unassisted trade could do no more to relieve such distress as existed, and to effect an equable distribution of supplies, than Government could do with all its resources.

7. *Mortality.*—This famine was followed by a very severe fatal epidemic of fever[6], which, as was specially noticed in Kutch, carried off several chiefs and merchants who had not suffered from famine. In Kutch and Katiawar[7] the year 1815 was remarkable from a plague of rats. In both these respects, the sequelæ of the famine resembled those of the famine of 1877.

8. *Famine of* 1824–25.—In these years a considerable and widespread scarcity extended over nearly the whole Presidency, but nowhere amounted to famine. There was a very general failure of the rain, which began well in July, but ceased suddenly. In October a heavy fall ensued, and the rabi crop was good; but the kharif was to a great extent a failure, and even in the[8] Concan districts the rice in the high lands was lost, and was poor on the low lands. In Bombay only 25 inches were registered, against an average fall of 85 inches. The previous year had however been a good one, and hence this failure was not severely felt. In Kutch not many emigrated and no one died; and there is no mention of mortality except in Ahmednagar, where some deaths from starvation occurred[9]. Prices went up to 8[9] seers per rupee in Ahmednagar; 6[10] seers in Satara, and[11] 6 to 8 in Sholapur. Government remitted the sea duty on important grain[12], and gave a lakh of rupees for relief-works in Surat[13]. Some works were also opened in [14]Ratnagiri, but no one came to them, except a few immigrants from the Deccan. In Bombay the immigrants, who were mostly from Kutch, were employed in deepening tanks and wells, and other useful works; but when rain fell their prospects brightened; they were sent back at Government expense to Kutch[15]. Besides this, considerable remissions were made in several districts: Rs. 1,61,987 in Kaira; Rs. 7,33,913[16], or half the year's demand, in Khandesh; in other cases detailed figures are not given. Collectors were allowed to forbid exportation of grain to foreign States, which on their part pursued the same policy; and at first the Lieutenant-Governor, Mountstuart Elphinstone, was in favour of offering a bounty on grain to induce the trade to import, or else of providing a fixed price for all such imported grain. But after a discussion[17] in which a member of council, Mr. Warden, upheld the pure doctrines of political economy, the Governor abandoned this intention and sided with his opponent.

9. *Scarcity of* 1833.—In this year there was a small and temporary scarcity, which chiefly visited the southern Mahratta country, and the south part of Hyderabad, especially the Gulbarga district, and in a lesser degree the northern Deccan and Guzerat. All the reports agree that in no place was that degree of intensity reached which constitutes a famine. Prices at Broach[18] were—wheat 9 seers and bajri 24 seers; in Sholapur, 5 to 6 seers; in Kaladgi, jowari 8 seers; in Dharwar 7 to 9 seers. Import

[1] E., page 33. [2] E., page 38. [3] E., pages 27, 32.
[4] E., page 36. [5] E., pages 123, 130. [6] E., page 23.
[7] E., pages 24, 36. [8] Page 120. [9] Page 82.
[10] Page 97. [11] E., page 98. [12] E., page 43.
[13] E., page 59. [14] E., page 120. [15] E., page 140.
[16] E., page 77. [17] E., pages 131, 137. [18] E., pages 55, 101, 105, 106.

duties were taken off in most cases, and relief-works were started in Sholapur and Kaladgi. Remissions were made in many places: to Kaira[1] Rs. 1,96,187, to Rewa Kanta Rs. 52,952 (out of the tribute of Rs. 1,70,304), in Surat Rs. 3,70,397, in Khandesh Rs. 3,61,677 (or 24 per cent. of the whole).

10. *Scarcity of* 1838–39.—In this year there was a scanty fall of rain in Bombay itself, and in the western part of Guzerat, Kutch, and Katiawar, and the result was a poor crop, and some scarcity, but not any severe distress. In Katiawar only a quarter of the tribute[2] could be collected, and a considerable body of fugitives from Kutch took refuge in Bombay.[3] Troops had to be sent from Ahmedabad to put down depredations in Katiawar.[4] Here they were employed as in former years on relief-works, but with very little out-turn of work. A relief committee was appointed, and public subscriptions invited for the care of the sick, old, and infirm who could not work. When a good fall of rain was reported in Katiawar the emigrants were shipped back to their own country, and to those who refused to go all further relief was stopped.

11. In 1845–46 there was a short rain-fall in the Deccan, involving some scarcity, which was rather severe in Khandesh. There, it is[5] said, a combination was formed among the local dealers not to import grain, but to run up prices; and the Collector asked leave to buy grain for Government, and open shops for its sale. But while this proposal was being discussed, the high prices attracted grain from other parts, especially from the Nerbudda Valley and Bhopal, and the local combination collapsed. Government remitted Rs. 6,47,845, or 38 per cent., of the revenue in this district, and remissions were also granted in Ahmednagar, Sholapur, and Poona.

12. In the preceding paragraphs the history has been given of everything that can be called a famine, or a widespread scarcity. Besides these events, a few smaller and more local scarcities may be briefly mentioned. In 1818 there was a partial failure of the crops in Sholapur and Kaladgi[6], and cholera is said to have broken out there for the first time. In 1820 or 1822 there was a great inundation in Sindh, which destroyed all the crops, on which the Amirs[7] opened the Government grain stores, sold grain at reduced rates, and gave remissions and advances to the cultivators. In 1853 there was a local failure in Sholapur[8] and Kaladgi from want of rain. In 1861 there was distress in Kutch. In 1862 there was a rather general apprehension of distress in[9] Poona, Ahmednagar, Sholapur, Khandesh, and Satara, and relief-works were sanctioned, but very little was found to be really required. In this year the Hyderabad State imported ten lakhs of rupees worth of rice from Calcutta and sold it below cost price, but it arrived too late to be of much use.[10] In 1864 relief-works were sanctioned in Khandesh,[11] and in 1865 in Surat and Kaira, but the need for them soon passed away. In 1866 there was a temporary scarcity in the Southern Mahratta Country[12] and Poona, due partly to failure of rain and partly to low stocks and over-cultivation of cotton; but though serious distress existed in the adjoining parts of Madras, Hyderabad, and Mysore, it does not appear to have pressed severely on any part of this Presidency, a seasonable fall of rain late[13] in September having saved a large portion of the crop. Prices, however, ran up as high as to $3\frac{1}{2}$ seers per rupee for jowari in Dharwar.[14] Relief-works were opened in Poona,[15] Kaladgi and Dharwar, Rs. 20,000, Rs. 10,000, and Rs. 93,300, respectively, being allotted for this purpose. In December all distress had disappeared.

## FAMINES IN UPPER INDIA PREVIOUS TO 1837.

[This abstract is compiled from Mr. Girdlestone's "Report on Past Famines in the North-Western Provinces" (Allahabad, 1868) (quoted as "G") and from Sir G. Campbell's Account of the Famine of 1783, reprinted by Mr. Geddes (quoted as "C"); other scattered sources of information are named in the margin when referred to.]

1. *Early Famines.*—Regarding the early famines that desolated Upper India very little real information can be gathered from the slight and casual mention of them

[1] E., pages 50, 54, 65, 77.
[2] E., page 37.
[3] E., pages 148, 150.
[4] Ariet.. Journal, XXV, 119.
[5] Pages 77, 152, 153.
[6] Pages 100, 104.
[7] Page 18.
[8] Pages 98, 105.
[9] Page 153.
[10] M.A.
[11] Page 155.
[12] Pages 89, 105, 107–116.
[13] Page 108.
[14] Page 110.
[15] Pages 87, 105, 108.

contained in history. The following facts are briefly abstracted from Mr. Girdlestone's report :—

1345.—This famine seems to have been more connected with the disturbed state of the country under Mahomed Toghlak than with drought. It is described as having been very dreadful in its severity, especially round Delhi.

1471.—This is referred to in the Orissa Famine Report as a year of notable famine, but the authority for so naming it is not known.

1631.—This is said to have extended over all India, but the only clear historical mention of it is in the Bombay Presidency. (See Abstract of History of Bombay Famines.)

1661.—As the Emperor Shahjahan in 1631, so did Alamgir in this year, exert himself to relieve the sufferings of his subjects; but he did it with more ability, and with a wider view :—[1]

"We know also that the events connected with the famine of 1661 made a great impression on Aurungzebe, and that he personally superintended the relief of his subjects, one of his plans having been to bring grain on a large scale from Bengal and the Punjab—a circumstance which shows that those provinces were unhurt. It is reasonable, therefore, to infer that the scene of the famine lay about Delhi, and the upper half of the Doab. Several things tend to prove that the calamity was severe. The Emperor opened his treasury and granted money without stint. He gave every encouragement to the importation of corn,[2] and either sold it at reduced prices, or distributed it gratuitously amongst those who were too poor to pay. He[3] also promptly acknnowledged the necessity of remitting the rents of the cultivators, and relieved them for the time being from the burden of other taxes. . . . . The vernacular chronicles of the period attribute the salvation of millions of lives, and the preservation of many provinces, to his strenuous exertions. Even when a margin has been left for manifest exaggeration, there can be little doubt that Aurungzebe's foresight and administrative ability caused the area of this famine to be much less extensive than was the tract of that which had devastated the country thirty years previously."

He was ably seconded by one at least of the great Hindu chiefs of the time, the Maharana of Udaipur :—

"The first famine in Rajputana, the account of which, in consequence of its intensity has been handed down to us in writing, and not by tradition, occurred in (Sambat 1717) A.D. 1661. The memorial of it is preserved in the beautiful marble bund[5] erected at Kankrowli in Meywar at an expense of a million sterling by the Maha Rana Raj Singh of Oodeypore to save his people during the dire calamity. This fairy-like structure of richly ornamented marble was thrown across the course of a stream which forces its way through a range of hills. The famine-stricken were employed in raising a long earthen bund, about three miles in length, circling round from the further end of the range, to retain the water which would otherwise have escapod in that direction. A noble work with nobler object and of more beautiful execution was never conceived by human intellect. The record is inscribed on a tablet let into the face of the bund itself, and the description carved in it might serve for the fearful time which Rajputana has just passed through."[4]

In 1739 the invasion of Nadir Shah brought famine to Delhi and its environs, but there is no mention of any natural drought.

In 1770 occurred the great Bengal famine, which is separately noticed under the head of that province. Some scarcity was felt or was professed in Allahabad when orders were received to send supplies down from there; but there is nothing to show that the famine itself extended west of the Karamnasa.

## Famine of 1783.

2. The same river was the eastern boundary of the great famine of 1783, the fame of which, as it survives in tradition and story, contests with that of 1838 the crown of pre-eminence over all famines in Upper India. It embraced the whole country from the eastern edge of the Benares Province to the Sutlej, and included Oudh and most of the

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[1] G. para. 10.
[2] Report of Orissa Commissioners, Part the 3rd, Section 6.
[3] Mill, Vol. II., page 349.
[4] Col. Brooke's Report, Famine of 1868–9, para. 31.
[5] It may be interesting and useful to bring together here some notices I have been able to find of relief works being started by native governments, in order to give employment to famine-stricken people. Major Powlett writes (p. 10 of his reply from Kotah)—"A former Raja of Bikanir was spoken of who employed "people during a famine in building a fort, and kept the work going at night as well as by day to enable "respectable people to come and earn grain without shame. I notice that Dr. Moore speaks of its being a "very rare thing in old times for Darbars to set relief-works going; and he has heard of but one old work "attributed to famine-relief. I do not think this is quite correct; for in Ulwar I can call to mind several "such old works. In Kotah, too, there are instances; and probably an intimate knowledge of any State "would reveal similar works."
The Azamgarh Settlement Report (Mr. J. Reid), page 14, relates how in 1783 a chakladar made a mosque and wells in Kopaganj to give employment to the starving people.

Central Indian States.[1] It was felt most acutely (as far as the imperfect records enable us to judge) in the region between Agra and Delhi and to the west of Delhi, but was less severe in the Doab north of Meerut and the sub-Himalayan tracts in the Punjab. Nowhere can it have been more intense than in the Hissar Division, the country then known as Hariana. Lieutenant Cunningham, in his history of the Sikhs,[2] writes—"A "famine desolated Hariana: the people perished or sought other homes. Sirsa was "deserted, and a large tract of country passed at the time from under regular sway "and could not afterwards be recovered by the Sikhs."[3] Captain Wace writes (in his reply to the Famine Commission, page 10) "no one can fail to observe the enduring "mark left on the country and its tenures by the famine of 1783. In Hissar that famine "literally depopulated the country, and the whole agricultural stock perished. At its "close hardly any of the original inhabitants remained. Few villages now existing even "pretend to a history which goes back to a period before this famine, and there is not "one that does not date its present form of tenure from the time when cultivation was "resumed." At the other end of the afflicted tract we have a similar testimony from the letters of Warren Hastings.[4]

"From the confines of Buxar to Benares," he wrote on 2nd April 1784, "I was followed and fatigued by the clamours of the discontented inhabitants. The distresses which were produced by the long continued drought unavoidably tended to heighten the general discontent; yet I have reason to fear that the cause existed principally in a defective, if not a corrupt and oppressive, administration. I am sorry to add that from Buxar to the opposite boundary I have seen nothing but traces of complete devastation in every village."

The rains of 1784 were timely and abundant, and nothing more is heard of extreme distress and high prices.

3. *Prices.*—The accounts of the prices of food are necessarily fragmentary. Colonel Baird Smith believed that 10 to 12 seers per rupee was the highest price reached, but Mr. Girdlestone has found record (in the *Calcutta Gazette* of 13th May 1784) of wheat selling at 4 seers at Lahore and 3 seers at Jummu. The collector of Saharanpur[5] reports a tradition that wheat sold there at 3 seers. In the Azamgarh Settlement Report (p. 14) Mr. J. Reid says that wheat sold at 14 seers, "an unprecedented rate for those days, doubtless, but not indicative of absolute dearth." In June 1784, Warren Hastings wrote that barley and gram were selling at 15 seers per rupee; but this was towards the end of the famine.

4. *Alarm and Measures taken in Bengal.*—The Bengal Province did not share in this famine to any considerable degree, but it only just escaped. The rains were very deficient in Behar and North Bengal, and the later rice crop failed very generally.[6] The Governor-General, Warren Hastings, wrote on the 15th October 1783—

"We are here under great apprehensions of a famine. The solstitial rains have failed in all the western parts of Hindustan from beyond Lahore to the Karamnasa. It has raged most violently in the countries most remote; our Province of Behar has suffered greatly by the failure of the last harvest and by the artificial want caused by the apprehensions of greater. The complaints and fears of it have already extended to Bengal where we have great plenty."[7]

The Government at this time, to encourage the influx of rice from the Eastern Districts, took off the duties on grain of every kind, but laid an embargo on exportation by sea except as regarded the contracts already made for the supply of rice to Madras, which wanted as much as 1,100,000 maunds, a quantity which, in the opinion of the Government, it would have been ruinous to let go out of the country; and in February 1784, finding themselves unable to supply rice to Madras, they sent for it to Batavia. It was decided[8] that buildings of solid masonry should be constructed to serve the purpose of perpetual granaries to the two provinces of Bengal and Behar, and the chief

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[1] Colonel Brooke says (para. 32)—"Another famine occurred in Sambat 1845 (A.D. 1789). The latter famine "was extremely severe, and is supposed to have exceeded in intensity even the terrible one of 1812–13." It is at first sight hardly likely that he should have written Sambat 1845 by mistake for Sambat 1840, the famous "Chalisa;" but that seems more probable than that there should have been another severe famine, five years after 1840, of which history makes no mention. That the famine *was* severe in Sambat 1840 (1783) is certain from the number of emigrants from Rajputana to Oudh, and from the prices which rose to 6 seers in Mewar and Marwar.

G. para. 10.

[2] Page 124.

[3] The famine drove Jassa Sing to cross with his army over to the Upper Doab, and to attempt an invasion of Rohilkhund, which shows that it was less severe in those parts. (*Ibid.* page 125).

[4] G. p. 9. [5] Reply to Famine Commission. [6] C. p. 423.

[7] O. R. I. 150. [8] C. p. 425.

engineer prepared a plan for a circular building at Patna, which still stands as a monument of past resolutions, bearing its inscription "For the perpetual prevention of famines in India," but empty and disused. In the autumn of 1783 the Government appointed a committee with very drastic powers to prevent the operation of the natural laws which by extending the area and the time over which a scarcity is felt tend to mitigate its intensity.[1]

"We direct that you do in the most public manner issue orders by beat of tom-tom, in all the bazars and gunges in the districts under your charge, declaring that if any merchant shall conceal his grain, refuse to bring it to market, and sell it at a reasonable price, he will not only be punished himself in the most exemplary manner, but his grain will be seized and distributed among the poor.

"The objects to which we also direct your attention are to obtain the most accurate state of the districts under your charge, in regard to the quantity of grain which may be expected from the crops on the ground, comparatively with the ordinary produce of former years.

"You will endeavour to obtain an account of all deposits of grain of every denomination, the places where it is lodged, and the names and places of abode of the persons to whom it belongs, and transmit it to us twice in every month, noting the quantity that may at different times be exported, and that which may be consumed in the district.

"You will particularly attend to the price of grain in the public markets, and order daily reports of it to be brought to you, an abstract of which you will transmit to us four times every month; and to frustrate any attempt to raise the price of grain to a higher rate than any real deficiency might give cause for, as well as to check any combinations of the merchants, we direct that, in any instance where a sudden or extraordinary advance of price is required, you will summon the persons to appear before you and assign their reasons for imposing such increase; and if they appear unsatisfactory, and with a view to extort a personal advantage from circulating a belief of a scarcity existing, you will prevent its having effect by forcing the sale of the grain at a rate which may be deemed reasonable and fair by such number of the principal inhabitants whom you will call upon for the purpose of fixing a rate of price; and that a public example may be made of every person attempting such practices, we direct that you hold them in confinement till you receive our directions from the report of the case which you will immediately transmit to us."

Nothing, however, is told us of the result of the working of this committee, except that the Government took much credit to themselves for the success of the measure. They also resolved to do all they could to encourage the immigration of cultivators from Oudh into Behar, and to settle them there on favourable terms, so as to remedy as far as possible the desolation caused by the famine of 1770.

## The Famine of 1803–4.

5. *The Famine Tract.*—The famine of 1803–4 visited nearly all that portion of the North-Western Provinces which was then known as the Ceded Provinces, from having been ceded in 1801 by the Nawab of Oudh. It was severely felt throughout Rohilkhand and the Lower Doab, from Farukhabad to Allahabad; Gorakhpur was slightly touched by it. Bulandshahr[2] was hardly reached by the famine and did not experience more than scarcity, which was mainly due to the war then going on: and probably this description applies equally well to all the Upper Doab. In Benares some alarm was felt in consequence of the drought, but no serious distress was suffered. No mention is made of this famine in the records of the Punjab, and hardly any in those of Central India and Rajputana. Colonel Todd says, that in this year[3], when Holkar was in the Bhartpur State and predatory armies were moving in every direction, and when famine and war conjoined to desolate the country, Kotah fed the whole population of Rajputana, grain being then rupees "55 per mani" of 450 seers, *i.e.*, $8\frac{1}{5}$ seers per rupee. In Western Malwa, too, the year is spoken of as one of distress: and as mentioned in the Bombay abstract, famine prevailed severely in this year in Kutch and Guzerat, and still more so in Deckan.

6. *Brief History of the Famine.*—In the beginning of 1803 the spring crop was injured by hailstorms and the country was disturbed by the expectation of war. Preparations were being made for the brilliant campaign in which General Lake, marching from Cawnpore on the 7th August, crushed the power of Sindhia and conquered the Upper Doab and Delhi. The monsoon set in late and light in the beginning of July, and after an interval rain fell again about the middle of August; it then ceased again, and in Cawnpore "hot winds were blowing as in May or June." Towards the end of September a final fall occurred which saved a good deal of the kharif as far as it had not been

[1] G. p. 8.

[2] Raja Lachman Singh's replies to Famine Commission.

[3] II. 542, "Annals of Rajasthan."

utterly withered up, and enabled the rabi to be sown, but which did not effect as much benefit as was hoped at the time, and gave rise to an unfounded belief that all anticipations of distress might be put aside; the area sown with rabi was probably smaller than usual, no winter rains fell, the means of artificial irrigation were then very scanty, and the spring crop was decidedly poor. A considerable emigration set in in consequence, and a large number of landowners shared in it, in order to escape from the pressure of the revenue demand. In Rohilkhand, though many of the defaulting landowners left the country, the tendency was the other way: there was a considerable immigration from the more drought-stricken tracts, and much mortality among the immigrants. Agrarian disturbances were common, and the collector of Moradabad had to call in the aid of the military to protect the standing crops against bands of starving men.[1]

The rains of 1804 seem, however, to have been timely and abundant, but the emigrant cultivators did not return at once, and the country did not recover its former condition of prosperity till another year had elapsed. "The Tahsildars" (who were then contractors for the collection of the land revenue, being bound to pay in the sum assessed, after deducting their percentage) "showed a general inclination to send in their resignations. "Many of the Malguzars...asked to have their engagements cancelled...and individuals "could not be found to take the estates of defaulters."[2]

7. *Degree of severity of the famine.*—The reports of the time, as far as Mr. Girdlestone was able to collect and compile them, give almost no information as to the main points by which it is possible to judge of the severity of the famine. Nothing whatever is said as to mortality or as to the sufferings of the people; little is recorded about the emigration except so far as it concerned the classes who took that mode of escaping from their revenue obligations: rare mention is made of prices,[3] and the figures given certainly do not connote what we should consider famine. We read of grain disturbances and field robberies in Moradabad alone and do not hear of crowds of people seeking for employment or begging for food, nor of skeletons lying by the road-side or scattered over the country. On the whole it seems probable that this famine was not very severe; the effects of drought were heightened by the ravages of war; the country was impoverished by long oppression; the English administrators as yet knew as little of the country and its resources as the people did of them and their principles of government; and the "magic of property" in land as yet did not exist to encourage the accumulation of capital or to bind the people to the soil. The main lesson to be learnt is, apparently, what severe effects a moderate seasonal calamity could produce, in days before the country had been enriched by the blessings of peace and the security following on a law-abiding administration.

8. *Remission of Revenue and advances.* Two principal kinds of relief measures suggested themselves to the Government: one of these was to help the landowners by the remission of revenue and the distribution of Takavi advances. The accounts brought together by Mr. Girdlestone are imperfect and not quite accurate; but the general conclusion derived from them is that out of a total revenue demand of Rs. 1,56,48,094 registered against the ceded provinces the sum of Rs. 1,23,79,696 were collected, and about 32½ lakhs of rupees were in arrears at the end of the year. Part of this, nearly nine lakhs, was remitted at the time and there is reason to believe

| Month. | Initial Balance. | Demand | Collection. | Closing Balance. | Remission. |
|---|---|---|---|---|---|
| | Rs. | Rs. | Rs. | Rs. | Rs. |
| October - - | — | 12,41,120 | 7,01,261 | 5,39,859 | — |
| November - - | 5,39,859 | 10,49,333 | 6,18,722 | 9,70,470 | — |
| December - - | 9,70,470 | 15,86,721 | 13,37,249 | 12,19,942 | — |
| January - - | 12,19,942 | 15,77,403 | 12,85,912 | 15,11,433 | — |
| February - - | 15,11,433 | 17,42,363 | 9,64,263 | 22,89,533 | — |
| March - - - | 22,89,533 | 15,64,536 | 15,26,418 | 23,27,651 | — |
| April - - | 23,27,651 | 19,89,942 | 18,32,739 | 24,84,854 | — |
| May - - - | 24,84,854 | 22,62,478 | 14,95,182 | 32,52,150 | — |
| June - - | 32,52,150 | 16,12,133 | 10,18,952 | 38,45,331 | 2,96,030 |
| July - - - | 35,49,301 | 9,37,495 | 10,00,408 | 34,86,388 | 3,65,100 |
| August - - | 31,21,288 | 85,570 | 3,16,705 | 28,90,153 | 2,25,763 |
| September - - | 26,64,390 | — | 2,81,887 | 23,82,503 | — |
| Total - | — | 1,56,49,094 | 1,23,79,698 | — | 8,86,893 |

Of the closing balance, Rs. 23,82,503, for September Rs. 35,820 is classed as under liquidation. The rest is either remitted or suspended, or no orders had been passed regarding it.

[1] Replies by collector of Budaun and Moradabad to Famine Commission. [2] G. p. 20.

[3] In July 1804, wheat and barley were at 60 seers per rupee in Bareilly. Baird Smith II, 17.
In September at Farukhabad wheat, which had risen to 20 seers, fell to 32 seers per rupee. G. 15.
Mr. Evans' Settlement Report for Farukhabad, page 9, gives the following scale of prices—

| | |
|---|---|
| 1803 - - - - - | 47 |
| 1804 - - - - - | 44 |
| 1805 - - - - - | 45 |

At Moradabad wheat was selling at 39 seers the rupee at the end of January and 31 seers early in February. G. p. 17.

that only about Rs. 35,000 were ultimately collected, the rest, or 32 lakhs, being remitted. This sum was distributed thus—

| | Remitted. | Year's Demand. |
|---|---|---|
| | Rs. | Rs. |
| Moradabad - - - - | 860,000 | 22,39,354 |
| Bareilly - - - | 470,000 | 23,24,927 |
| Farukhabad - - - | 168,000 | 10,63,067 |
| Etawah - - - | 762,000 | 28,99,356 |
| Cawnpore - - - - | 410,000 | 26,06,857 |
| Allahabad - - - | 503,000 | 28,95,532 |
| Gorakhpur - - - | 47,000 | 16,20,001 |
| | 32,20,000 | 1,56,49,094 |

Advances to the amount of Rs. 1,80,826 were granted to Cawnpore, and Rs. 94,123 to Allahabad, and other districts made urgent applications for similar grants. The amount given to them is not on record, but as the temper of the Government was strongly in favor of making such grants, Mr. Girdlestone estimates the total amount advanced at about ten lakhs. There is nothing to show what portion of these advances was recovered.

9. *Bounty on importation.*—The other measure of relief affected the population at large and consisted in offering a bounty on the import of grain from Bengal. A proclamation was issued, promising bounties of varying amounts from Rs. 17 to 31 per hundred maunds, on wheat or barley imported into four different stations, Benares, Allahabad, Cawnpore and Fatehgarh, and slightly lower amounts were promised for other grains. There is nothing to show how much this cost the Government or what quantity was imported under this stimulus. Suggestions were also made to forbid exportation from British territory into the surrounding country, but the rainfall of September, which encouraged the hopes of every one, prevented the collectors from advocating the measure, and the export trade went on, Moradabad feeding Delhi and the south, Bareilly supplying Hatras and the Central Doab, and Gorakhpur sending food-grains into Oudh.

10. *Works of irrigation.*—The Board of Revenue also recommended collectors to undertake temporary works of irrigation, and several small enterprises of the kind were started, especially in Rohilkhand, where it is an easy task to dam up the surface streams. But as these works were not projected with any support from engineering science, it is probably as well that they were not completed or made permanent when the famine was over.

11. *Principle laid down as to collection of revenue in years of drought.*—The Supreme Government felt some alarm lest the large remissions of revenue that were made should be taken by the people as a precedent, and the following important resolution was issued in September 1804 to warn the land-owners that this was not to be expected:—

"His Excellency in Council, however, is not without apprehensions that the general remissions of revenue granted in the Fuslee year 1211 may induce the landholders to rely on obtaining remissions whenever the periodical fall of rain shall prove insufficient for the purposes of cultivation. Under this reliance on the liberality and generosity of the Government, some of the landholders might omit to use those exertions for the improvement of their lands which Government is justly entitled to expect they should employ. The public revenue would consequently be rendered fluctuating and precarious, and material embarrassment might arise in the financial arrangements of the Government.

"His Excellency in Council therefore considers it to be of importance that the persons paying revenue to Government in the Ceded Provinces should be apprized that the remissions allowed to them in the Fuslee year 1211 were granted (as already stated) in consideration of the unprecedented extent in which the calamity of drought had prevailed, and also of the generally impoverished state of the country, and that the most confident expectations are entertained that they will obviate the necessity of preferring similar claims in future, by employing their utmost exertions for the extension of the cultivation and for the general improvement of the country. The great extent of the indulgence which the proprietors of land and other descriptions of landholders have experienced from the British Government, and the laws which have been enacted for the protection of their persons and property and for securing to them the enjoyment of the fruits of their industry, will, the Governor-General in Council trusts, satisfy them of the justice and reasonableness of these expectations."

## Period from 1804 to 1837.

[Materials, Girdlestone's History of Past Famines, North-Western Provinces, (G) pp. 27–42, and other authorities specially quoted.]

12. *The Famine of* 1812–13 *in Rajputana.*—During this period there were several scarcities, more or less local, of which little is known except that they cannot have been very severe, or else their record would have been fuller. The focus of severity of the famine of 1812–13 was in Rajputana, and but little is on record concerning it. Colonel Brooke says of it, in paragraph 32 of his report (9th December 1870) on the famine of 1868–70—"The memory of it still lives in the minds of old men. It is said to have "lasted five years, of which, however, the second was not a complete famine, and during "another year the crops were destroyed by locusts. Three-fourths of the cattle died and "as in 1661 man ate man. Large tracts of country became depopulated...grain was not "to be purchased. Skeletons lay in every direction. The famine was followed by "plentiful rain, after which numbers succumbed to low fever brought on by their emaciated "condition." The Political Agents of Bikanir, Marwar, Kotah, and Mewar, all speak of it[1] as well remembered in those territories. Captain Powlett says, that in Kotah and Bundi grain sold at 5 seers per rupee (the highest rate ever known) and that this famine was considered to have been even more severe than that of 1868. In the history of Bombay Famines it figures prominently, having been very severe in Kutch, Katiawar, and Guzerat.

13. *Scarcity in North-Western Provinces.*—Only the districts of the North-Western Provinces bordering on Rajputana suffered from this famine, and no part suffered very severely. The majority of the province had an excellent monsoon and harvest; but in the trans-Jumna tracts the rains of 1812 were very scanty, and both the rain crop and the spring crop of 1813 were extremelypoor. A large emigration from the Agra and Hamirpur Districts set in, but the emigrants soon returned, and with them in the rainy season of 1813 came many immigrants from the west. The price of wheat[2] rose in Agra from 34 seers in 1812 to 20½ seers in 1813, and fell again to 30 seers in 1814.[3]

[2] Price of wheat in seers per rupee.

| | Agra. | Aligarh. | Farukhabad. | Bareilly. |
|---|---|---|---|---|
| 1812 | 33·14 | 35·8 | 61 | 56 |
| 1813 | 20·9 | 23·8 | 39 | 37 |
| 1814 | 30·7 | 35· | 45 | 57 |
| 1815 | 41·9 | 47·14 | 48 | 73 |

The figures for Agra and Aligarh are from Mr. Girdlestone's Report, p. 28. Those for Farukhabad and Bareilly from the Settlement Reports by Mr. Evans, and Mr. Moens (pp. 9 and 59 respectively).

[3] Mr. Porter, in his Settlement Report of the Allahabad District, p. 14, says that Government prohibited the export of grain. The authority for this statement is not given.

The remissions of revenue hardly amounted to more than Rs. 20,000 in all the districts that suffered from the drought. It may confidently be said that there was nothing that can properly be called famine in the North-Western Provinces.

14. *Scarcity of* 1819.—In 1819 there was a partial failure of rain in Benares, Allahabad, and Bundelkhand. The Collectors of Bareilly, Moradabad, Aligarh, Meerut, and Saharunpur were directed each to buy up grain to the value of half a lakh of rupees, to be despatched to Cawnpore and Allahabad, and the Collector of Agra to the value of one lakh for despatch to Kalpi and Banda, but it is not clear in what way, or with what results, the grain was disposed of. The balances at the close of the year seem, however, to have been small, and there were no remissions worth notice.

The average price of wheat throughout the year 1819 was at Agra 17, at Aligarh 19 seers per rupee; at Benares it sold for some time at 21 seers, when the river was too low for grain boats to pass up. At Jaunpur, after the severe frost of January had killed a large portion of the crop, it rose as high as 10½ seers per rupee (B.S. II. 17). At Cawnpore in September the price rose to 9¾ seers owing to exportation eastwards. In Banda it went up to 7 or 8 seers per rupee. In Allahabad the price which averaged 23½ seers in 1817 stood at 13½ in 1819.[4] Other statistics collected from the Settlement Reports of the districts are as follows:

| | Cawnpore. | Farukhabad. | Bareilly. |
|---|---|---|---|
| 1817 | 32·11 | 15 | 43·8 |
| 1818 | 28·9 | 23 | 26·1 |
| 1819 | 17·11 | 20 | 23·6 |
| 1820 | 17·1 | 21 | 18·11 |
| 1821 | 26·8 | 40 | 44·1 |

[1] In their replies to the questions of the Famine Commission.

[4] Settlement Report, Allahabad, p. 42.

15. *Scarcity of* 1825.—In 1825 there was a decided failure of the rains over all the districts west of Cawnpore, the kharif was extremely poor, and the winter rains being deficient the rabi also was a good deal below the average.[1] Prices, however, were not high.[2] Gloomy reports were sent up, great losses of revenue anticipated by the collectors, and permission was given by the Governor-General to remit as much as one-fourth of the revenue, if such a measure should be found necessary: but in the end all the apprehensions seem to have melted away and the collections were as large as usual.[3]

[1] The Collector of Muttra estimated the out-turn of the rabi at one-sixth less than that of ordinary years, which is not a great falling off. (Collector's reply to Famine Commission.)

[2] Wheat, in February at Meerut 25 seers per rupee. (G. 37.)
The following figures are taken from different Settlement Reports. Those for Agra are from Colonel Baird Smith.

| — | Agra. | Cawnpore. | Farukha-bad. | Bareilly. | Muzaf-farnagar. |
|---|---|---|---|---|---|
| 1824 | 31·6 | 30·2 | 30 | 43· | 47 |
| 1825 | 27·14 | 31·9 | 41 | 31·6 | 45 |
| 1826 | 19·12 | 24·2 | 27 | 22·11 | 30 |
| 1827 | 21·14 | 23·1 | 15 | 37·6 | 35 |
| 1828 | 30·12 | 34·1 | 33 | 48·1 | 46 |

The following table shows what I have been able to discover as to prices of wheat at other places, from the district Settlement Reports:—

| — | Cawnpore. | Farukha-bad. | Bareilly. | Muzafar-nagar. | Agra. |
|---|---|---|---|---|---|
| 1832 | 38·8 | 45 | 28·14 | 50 | 34·7 |
| 1833 | 39·8 | 38 | 40·12 | 40 | 31·2 |
| 1834 | 27·15 | 27 | 32·3 | 30 | 25 |
| 1835 | 31·14 | 48 | 31·11 | 40 | 29·9 |
| 1836 | 32·8 | 34 | 34·3 | 50 | 32 |
| 1837 | 28·6 | 30 | 24·1 | 35 | 23·3 |

16. *Scarcity of* 1833–4.—In 1832 and 1833 the rain-fall was very deficient in Rajputana, and the neighbouring parts of the Punjab and North-Western Provinces, and this resulted in severe distress in 1833–34. In Rajputana, Colonel Brooke says[4] that the famine of 1833 was confined to Mewar and Sirohi, but the Political Agents report[5] that it was severe also in Kotah, Bondi, Marwar, and Bikanir. In 1832 almost the whole revenue of Ajmir and the Hissar Division had to be remitted.[6] In 1833 the Kharif failed to a great extent in Bundelkhand, and especially in the district of Hamirpur, where great distress prevailed. The Government made a grant for the support of the destitute, in aid of private subscriptions, and up to the end of November 1833 Rs. 20,150 had been spent in this way. It was said that through famine, pestilence, and emigration the districts of Hamirpur and Kalpi lost half their population.[7] The balances at the close of this year, which were usually about five lakhs of rupees, stood at 66¾ lakhs; but how much of this was remitted, and how much ultimately collected, is not known.

17. *Period before the great famine of* 1837–38.—It is commonly held that the great famine of 1837–38 was preceded by several peculiarly unsettled years and by a series of short crops; but there does not seem to be any good foundation for this belief. The table of prices given in the preceding paragraph shews that after 1834 prices generally recovered themselves, and stood pretty nearly as high as they did before 1833; and in those days, when exportation was rare and inconsiderable, the year's prices were a pretty fair indication of the preceding season's crop. Even Colonel Baird Smith[8] seems to have fallen into error here: he says—"The famine of 1837–38 was in fact the crisis of five or "six years of great climatic irregularity. Such irregularity seems indeed to be a "characteristic preliminary sign of a complete suspension of the usual rainfall, and I "trace it more or less clearly through the series of greater droughts," and yet he goes on to state that 1834 was a year of abundant rain, and bore a good crop; 1835 was dry, and the crop indifferent, but 1836 was again a prosperous year as to rainfall and harvest. This is as much as could be said for any three ordinary years chosen at random, and it seems to be a fair conclusion that the drought of 1837 was not preceded by any specially warning symptoms, and that the stocks had not been depleted by a succession of bad harvests.

## THE FAMINE OF 1837–38 IN UPPER INDIA.

[Authorities.—Colonel Baird Smith's second report dated 14th August 1861 (quoted as B. S. II.), Mr. Girdlestone's Report on Past Famines (1868) quoted as G.]

1. *The Famine Tract.*—The drought of 1837–38, which undoubtedly produced the most grievous famine experienced in Upper India since the commencement of British rule, had its central region of extremest severity in the region between Agra and Cawnpore,

[3] Raja Lachman Singh says (reply to Famine Commission), that large remissions were given in Bulandshahr, but the figure is not stated.

[4] Para. 33, Report. [5] Replies to Famine Commission. [6] G. p. 40.

[7] G. p. 41. [8] II. 18, 28.

and extended to all the surrounding parts of the North-Western Provinces and the Native States to the south of Agra. The most easterly point where it was felt was the Allahabad District, but neither there nor in Fatehpur was it acute. It was slight also in the eastern part of Rohilkhand, in the Bulandshahr and Aligarh districts, and in Delhi. But the whole Doab, from Cawnpore to Hatras inclusive, and the Trans-Jumna districts of Banda, Hamirpur, Kalpi, Agra, Muttra, and Gurgaon, felt its full force, and so did the eastern States of Rajputana, Alwar, Jaipur, Ajmere, Kerauli, Bhartpur, Dholpur and Gwalior; no mention is made of Jhansi or Lalitpur in the reports, but it is hardly likely that they can have altogether escaped. The western States of Rajputana are said by Colonel Brooke (paragraph 33) to have had a good harvest; and Oudh also escaped from the drought, for food grains were exported from there till the export was stopped by the prohibition of the Nawab Vazir.[1]

2. *Area and Population of Famine Tract.*—The map attached to this section agrees mainly with that drawn up to accompany Colonel Baird Smith's report, but differs from it in including the Native States to the south, and also the districts of East Rohilkhand and of East Gurgaon, Rohtak and Hissar. Mr. Girdlestone too is undoubtedly right in his remark that Fatehpur[2] (and Allahabad must go with it) does not belong to the darkest famine tract.[3] According to this calculation the total area of British territory involved was 38,187 square miles in extent and contains now a population of 15,671,000 souls. The darkest portion of the tract was 17,746 square miles in area, and its population is now a little over seven millions, and was probably not much smaller then.

Darkest tract—

| | Sq. miles. | Population. |
|---|---|---|
| Muttra | 1,346 | 730,000 |
| Agra | 2,178 | 1,254,000 |
| Farukhabad | 1,720 | 916,000 |
| Mainpuri | 1,697 | 766,000 |
| Etawah | 1,698 | 669,000 |
| Etah | 1,512 | 702,000 |
| Cawnpore | 2,337 | 1,156,000 |
| Banda | 2,961 | 698,000 |
| Hamirpur | 2,297 | 529,000 |
| Total | 17,746 | 7,420,000 |

Slightly affected—

| | | |
|---|---|---|
| Fatehpur | 1,631 | 669,000 |
| Allahabad | 2,840 | 1,396,000 |
| Shahjahanpur | 1,744 | 949,000 |
| Bareilly | 2,993 | 1,507,000 |
| Budaon | 2,000 | 940,000 |
| Aligarh | 1,904 | 1,073,000 |
| Gurgaon | 1,980 | 696,000 |
| Rohtak | 1,811 | 537,000 |
| Hissar | 3,540 | 484,000 |
| Total | 20,443 | 8,251,000 |
| GRAND TOTAL | 38,189 | 15,671,000 |

Adding in the Native States and the British district of Ajmir-Merwarra, which are estimated to have a total area of 58,000 square miles, and a population of 7,416,000, it may be said broadly that the area affected by famine in 1838 was 96,000 square miles and the population 23,000,000.

3. *Brief History of the Famine.*—No observations were made in any part of the North-Western Provinces, in those days, as to the amount of rainfall, and the information as to the degree of its failure is very imperfect. Hot dry (west) winds are recorded as blowing at a time when the air ought to have been laden with moisture, but there is

[1] B. S. App. II.—The prohibition was taken off after a time, under pressure.

[2] See also Mr. Patterson's Settlement Report, p. 33—"The district only suffered partially, and the distress "of the poorer classes was caused, not by the failure of crops, but on account of the high price of grain owing "to exportation westward."

[3] Colonel Baird Smith estimated the area of the Famine Tract at 20,000 to 25,000 square miles, and the population as eight or nine millions. The district included in the text in the Darkest Tract, with Allahabad and Fatehpur added, would be 22,000 sq. miles in extent and their population 9¾ millions now. No doubt it was not quite so large then.

nothing to show how long this lasted, nor whether the monsoon was altogether deficient from the first,[1] or as so often happens began well and then ceased untimely. But its abnormal character throughout July and August was very marked, and all the signs of alarm and anticipation of a great calamity were present. Prices rose, the country became disorganized, emigration began, and loss of life among men and cattle was reported. In September a fall of rain occurred which raised the hopes of every one, and no doubt did much to save the remains of the crop, but it was very partial, and in the country between Cawnpore and Meerut it was almost entirely wanting. The rain was hardly sufficient to moisten the ground for the rabi crop, and very little land was sown except with the help of artificial irrigation. In October Mr. John (Lord) Lawrence, Collector of Gurgaon, wrote—"I have never in my life seen such utter desolation as that which is now spread "over the parganas of Hodal and Palwal." In Cawnpore Mr. Rose, the Collector, writes that in November in many villages "the whole community had gone off to the "Saugor" (*i.e.*, the Central) "Provinces, or had sought employment in neighbouring "districts."[2] In many villages of Agra, writes the Commissioner on 6th January 1838, all but the zemindar and his immediate family, the aged who could not travel, and the banias, had moved off "to the right bank of the Jumna above Delhi, or the Tarai."[3] In January 1838 Lord Auckland took direct charge of the Government of the North-Western Provinces and marched from Cawnpore through Farukhabad, into Rohilkhand and through Moradabad, to Meerut. His letter, dated 13th February,[4] to the Court of Directors gives a valuable account of the state of things observed by him, but the strain of severest distress was only then beginning. Every effort was made to extend the area of well irrigation, and the two canals then in existence, the Eastern and Western Jumna, which had only watered 30,000 or 40,000 acres in 1833, now supplied 400,000 acres.[5] But in spite of all this the rabi crop was extremely poor, and gave but little relief to the country, and as soon as it was cut, the numbers applying for relief were extremely large. In Cawnpore in March a special establishment was required to patrol the streets and the river in order to remove the corpses lying in lanes of the city and in back waters of the Ganges. In Fatehgarh and in Agra the same kind of thing was going on, and the most harrowing descriptions were written of the sufferings of the famine-stricken. The rains of 1838 at last, though they held off for a time, occasioning fresh anxiety, seem in the end to have been sufficient to raise a good crop and to put an end to the distress.

4. *Crime.*—One symptom, in the exhibition of which this famine is almost singular, was the extent to which violent crime prevailed. It broke out in Budaon, Bareilly, and Shahjahanpur even before any serious pinch began, in July or August,[6] and the disorganization rapidly spread along the main road and the course of the Ganges. The robberies were chiefly directed against grain carts, but even travellers could not journey safely along the roads. Troops had to be moved out in some cases, and it was found necessary to entertain a large additional force of police before this turbulent spirit could be put down.

5. *Mortality.*—Of the loss of life caused by the famine hardly any materials exist for forming an estimate. The famine was not without its usual concomitants. Small-pox is reported as having broken out in Cawnpore in March, cholera in Farukhabad in May.[7] At Agra the daily burials by the police were reckoned as 400, and yet the roads and the river bank were lined with corpses. The Settlement Reports written shortly after this date abound with references to the depopulation of the districts. Colonel Baird Smith estimates the loss of life due to famine as 800,000. Our present increased knowledge of the effect of a first-class famine on the vital statistics of a province leads to the opinion that this estimate errs in being greatly below the mark.

6. *Wanderings of the Famine-stricken.*—The notices bearing on emigration seem to show that the people were bewildered under this calamity and had no information as to where they were likely to find a better state of things than that they were flying from. The emigration from Cawnpore and Agra to the Central Provinces, the Punjab, and the Tarai has already been mentioned, but there was a counter-stream of immigration pouring in from Rajputana and Central India, and there was much aimless wandering in search

[1] In Bhartpur it is said (Political Agent's reply to Famine Commission) that no rain at all fell in July, August, and September. In Agra the kharif was not such an utter failure as in 1877. (Collector's reply).

[2] G. pp. 44–46. [3] G. p. 53.

[4] G. p. 45. [5] G. p. 69. B. S. II, 21.

[6] The immediate cause seems to have been that the grain merchants, alarmed at the prospects of calamity, closed their stores, and refused to make any advances for seed-grain or food-grain; on which the people growing desperate attacked the pits and opened them forcibly. (See replies of Collectors to Famine Commission.) In August and September 1837 there were 200 such "dacoities" in Budaon.

[7] G. p. 93. B. S. App. II.

of relief wherever it was reported to be liberally given. At Bilhaur (in Cawnpore) three-quarters of the destitute were wanderers from Etawah, Mainpuri, Farukhabad, and Agra, and in other parts of the district there were immigrants from Gwalior. At Agra it is said (probably with some exaggeration) that 300,000 people from the Doab had been attracted to the city by the rumour of indiscriminate relief. Bulandshahr was crowded with fugitives from Hariana. In Kalpi and Hamirpur the immigrants from Native States were so numerous that the local authorities began to refuse them admission to work, and thus the number employed, which had been 6,900 in February, sank to 2,900 in March. It is needless to remark how this wandering of the famine-stricken must have increased their mortality.

7. *Prices.*—Our information on the subject of prices is very imperfect. Colonel Baird Smith in 1861 could find no instance of a higher price than 11½ seers per rupee;[1] but though he was probably right in holding that prices as a rule did not reach a figure which we should now consider as indicating extreme tension, Mr. Girdlestone has shown that there were many instances which exceed the rate mentioned. In Banda wheat had already risen to 10 seers per rupee in August,[2] in Fatehgarh it was 11¾ seers in September.[3] In January Mr. Rose says that half a seer of the cheapest grain cost one anna,[4] so wheat must have been selling at less than eight seers. In Bulandshahr, an exporting district, gram rose to eight seers per rupee[5] and in Budaon wheat sold for seven seers the rupee.[6] Lord Auckland says that in all the famine tract the price of wheat varied from 10 to 16 seers. All the information that can be collected from different sources is shown in the margin,[7] but these price lists which show the average of the year are not as indicative of the extremity of the pinch as statements which show the highest price attained at the worst time. At the same time, that is in January 1838, Mr. Hamilton, Commissioner of Agra, wrote that the price of wheat in Malwa was from 50 to 60 seers per rupee.

[7] Col. Baird Smith Prices of 1837-38. Girdlestone's Av. of 1837 and 1838.

| | | |
|---|---|---|
| Agra | 11¼ to 13¼ | 17⅛ |
| Fatehgarh | 11¼ | |
| Muttra | 12 | |
| Cawnpore | 13½ | 17 |
| Allahabad | 17½ | |
| Aligarh | 18 | 20 |

The Settlement Reports before quoted from give the following gures:—

| | Agra. | Cawnpore. | Farukha-bad. | Bareilly. | Muzaffar-nagar. |
|---|---|---|---|---|---|
| 1837 | 23·3 | 28·6 | 30 | 24·1 | 35 |
| 1838 | 13·9 | 18·7 | 14 | 17·12 | 20 |
| 1839 | 20·4 | 26·3 | 34 | 22·1 | 20 |

In Saharanpur wheat which had been 55 seers at the beginning of the year rose to 18 seers; in Muttra the highest price was 12 seers.

In Allahabad it was 17½ seers. (Replies by collectors.)

8. *Relief measures by Government.*—The principles of relief laid down by Government differed in some respects from those which had been adopted before. Remissions and suspensions of revenue were to be freely given, but Takavi advances were discouraged, except for the purposes of permanent improvements; as mere loans, it was held they made the people rely too little on themselves; and if wanted for seed-grain, seed should be given, not money. But the duty of providing employment for those willing to labour had never been so fully recognised before, and commissioners were empowered to disburse unlimited sums on behalf of applicants for work.[8] The gratuitous relief however of those unable to work was absolutely rejected as being in no way the duty of Government, but entirely incumbent on the charitable public.

9. *Relief-works chiefly under Civil Officers.*—Some of the relief-works were carried on by the officers of the Public Works Department, and one of the earliest grants made by the Lieutenant-Governor in August was to facilitate the employment of a large number of people on the Grand Trunk Road. But it seems rather that the existing works were enlarged for this purpose, and enabled to employ a greater number of labourers, not that any special works were opened under professional officers in places where relief was most needed. It is apparent that the great majority of the relief labourers were under the civil officers, and Mr. Rose of Cawnpore expressly complained of this,[9] arguing that the

[1] B. S. II, 28. [2] G. p. 43. [3] B. S. App. II.
[4] G. p. 47. [5] G. p. 58. [6] Collector's Reply to Famine Commission.

[8] In communicating this sanction to the magistrate of Farukhabad, the Government wrote—"This expenditure is sanctioned, not with a view to the profitable outlay of capital, but as a criterion by which to judge of the real state of distress that is prevailing." G. p. 54.

[9] B. S. II, 31. "The first error was leaving the superintendence of the labour of the starving people in the hands of the local civil officers, instead of appointing to that duty an engineer officer with a large and efficient establishment of subordinate Europeans to assist him. It is short-sighted economy, when the Government have to employ a starving population, not to go to the expense of entertaining an establishment sufficiently able and extensive to insure that their labour is well applied. In this district it is useless to deny (and I make the acknowledgment with less hesitation, because it chiefly reflects upon myself) that the advantages derived from the labour of the working poor in 1838 were far from commensurate with the expenses incurred, and nothing like that profit which would have resulted under a more efficient superintendence was obtained."

civil officers were overburdened with other duties, and not specially fitted for this task, and that the relief-work ought to have been made over to the Engineer Department.

10. *System of management and rates of wages.*—The general system on which these works were carried on was one of daily payment, and in all probability the tasks executed were extremely light, and the value of the work almost *nil.* No general orders seem to have been issued by Government as to wages, and every collector was left to settle them as he chose. In Cawnpore at first men received one anna, women three-quarters, children half an anna; afterwards these rates were reduced to three-quarters of an anna for men and women, half to one quarter of an anna for children. "Able-bodied men who "had originally been hired at the market price were restricted to one anna a day, at "which rate they could just buy half a seer of the cheapest grain, and less than this "would not have kept up the degree of strength which enabled a man to get through his "daily task." A wage of three-fourths of an anna was, therefore, a starvation rate; and yet the wages were reduced to half and a quarter of an anna per man, without driving away applicants for labour. Mr. Rose having received a monthly grant for relief work distributed it to the different parts of the district, and made it go as far as he could, employing each applicant every other day where the number of applicants was not more than double the number that could be paid daily out of this fund. But in Bilhaur (the north-west corner of the district adjoining Farukhabad) "only 800 could "be employed, while 5,000 were clamouring for food, and there it was thought better "to select the most deserving for permanent employment, and to exclude the rest." It is hard to see how this restriction of funds can be reconciled with the principle laid down that unlimited sums were to be disbursed to those who would give labour in return for food. And yet Mr. Rose's measures were highly commended, and his reports circulated as a guidance to others, though they involved the principle, which subsequent experience has shown to be so dangerous, of giving relief which is less than sufficient to support life. At Fatehpur the wages given were one anna for a man, a quarter for a child. At Hamirpur they were the same as the initial rates at Cawnpore. At Fatehgarh the wages were given in grain; and the scale laid down is of interest as being the first attempt to define what food is required for the subsistence of labourers[1]:—

| | Food. | |
|---|---|---|
| | Flour. | Dal (pulse). |
| | oz. | oz. |
| Diggers and carriers - - - | 24 | 4 |
| Men, and women with infants - - | 20 | 4 |
| Women, and orphan children able to cook for themselves - - - | 16 | 4 |
| Children above 10, having parents - - | 16 | 0 |
| Children under 10 - - - | 12 | 0 |

Besides this, each got one pie to buy fuel, and the adults received a pice-weight of salt, the children three-fourths of a pice-weight.

| Months. | Average Number employed daily. | | | | |
|---|---|---|---|---|---|
| | Farukhabad. | Cawnpore. | Fatehpur. | Agra. | Hamirpur. |
| August 1837 - - | 328 | — | — | — | — |
| September ,, - - | 1,185 | — | — | — | — |
| October ,, - - | 1,233 | — | — | — | — |
| November ,, - - | 732 | — | — | — | — |
| December ,, - - | 854 | — | — | — | — |
| January 1838 - - | 4,626 | 2,890 | — | — | — |
| February ,, - - | 9,115 | 5,239 | — | — | 6,900 |
| March ,, - - | 15,878 | 4,347 | — | 77,500 | 2,900 |
| April ,, - - | 11,969 | 6,365 | 610 | — | 3,000 |
| May ,, - - | 15,301 | 6,439 | 1,899 | — | — |
| June ,, - - | 17,689 | 5,862 | 1,944 | 73,604 | — |
| July ,, - - | 11,684 | 1,572 | — | — | — |
| August ,, - - | 3,549 | — | — | — | — |
| Total - - | 94,142 | 32,714 | — | — | — |
| Average number - | 7,241 | 4,673 | — | — | — |
| Average cost per head per mensem, Rs. - | 1-11-8 | 1-5-6 | — | — | — |

11. *Numbers employed and cost of relief-works.* — Respecting the numbers relieved and the cost of this kind of relief, the information is very scanty. Farukhabad is the only district in which the numbers employed are recorded month by month from the beginning to the end; but the table[2] brings together the scattered notices which are found in the records. The numbers in Agra are vastly in excess of those in any other district, but no contemporary report has been preserved commenting on this or explaining its cause. The following figures are all that can be traced to show what Government expended on relief-works:—

[1] B. S. App. II.

| | | | Rs. |
|---|---|---|---|
| Expended by the Public Works Department | | | 3,77,076 |
| By civil officers, | Farukhabad | | 1,63,006 |
| „ „ | Cawnpore (7 months only) | | 44,004 |
| „ „ | Agra[1] | | 13,20,000 |
| „ „ | Fatehpur[2] | | 11,638 |
| „ „ | Banda | | 1,677 |
| „ „ | Hamirpur | | 46,694 |
| | Total | | 19,64,095 |

And this does not include several of the blackest districts, as Muttra, Mainpuri, and Etawah, in which a large expenditure must have taken place.

12. *Gratuitous relief.*—The relief of the helpless and infirm was thrown by Government entirely on the shoulders of the public, but Rs. 9,000 were granted to assist the funds at Agra, Cawnpore, and Farukhabad. A relief committee was formed in Calcutta, which collected and remitted to the North-western Provinces Rs. 1,46,000; Bombay also sent Rs. 15,000, and one district in Bengal (Berhampur) Rs. 6,596. Others may have done the same, but their gifts have escaped record. Local charity was very active and extensive in the affected districts; in Farukhabad the European community subscribed Rs. 600 a month, and the native Rs. 1,500. In Agra the amount contributed in this way must have been extremely large, the numbers to be fed being enormous; in Cawnpore, in January, February, and March, Rs. 2,000 were collected. There is nothing on record as to the method in which this relief was distributed, whether it was given in cash or in raw grain, or in cooked food, and what tests were imposed or what measures taken to keep off unworthy applicants. The numbers relieved are nowhere recorded in full except in Farukhabad, where 1,402 people on an average were fed daily for 13 months at the cost of Rs. 1-5-3 per head per mensem, the highest number being in June 1838, when 3,300 were fed. In Cawnpore the numbers charitably relieved in March were 1,500 a day. In Agra they were far more numerous. In February the number was 3,800, and the cost Rs. 2,483. In June it had risen to the enormous number of 40,000 a day.[3] It is hard to conceive how private charity can have been equal to the strain of such an expenditure as this, which cannot have been less than 1½ lakhs of rupees, or 15,000*l.* in this single city. The total cost of relief elsewhere (as far as is known) is put by Mr. Girdlestone at about two lakhs, though several districts in which the helpless poor were fed are omitted. On the whole, the amount expended charitably cannot have been less than 3½ lakhs of rupees.

13. *Remission of revenue.*—With regard to remissions of revenue the accounts are very imperfect. Mr. Girdlestone searched through the records of the Board of Revenue and could find proof of only Rs. 48,87,360 having been remitted. But other equally authentic district records have been produced which show a much larger sum, and altogether the conclusion arrived at in his report is that the amount remitted cannot have been less than 90½ lakhs of rupees out of a total demand of 360 lakhs. Of this, 22 lakhs were remitted in Agra, 17 in Cawnpore, 7 probably in both Farukhabad and Mainpuri, 4 in Hamirpur, 5 in Rohtak, 4 in Hissar, 3 in Gurgaon, and 3 in Muttra.

Besides this, we learn from the district replies to the Famine Commission, that in Bulandshahr Rs. 45,000 and in Budaun Rs. 3,05,000 were remitted, thus raising the probable total to 95 lakhs of rupees.

14. Large, however, as was the amount remitted, there was some questioning at the time whether the steps taken preliminary to suspending or remitting the revenue were the wisest that could have been adopted. Mr. Rose, collector of Cawnpore, in his Settlement Report wrote as follows:[4] "The second error" (the first being the one quoted above, that relief-works were made over to civil and not to engineer officers)—

"was in not being sufficiently explicit and early in making known to the people the extent of negative relief intended to be granted by means of remission of revenue. It is true little or nothing was collected by Government until the spring (rabi) harvest was ripe, and the people were early told they were to

---

[1] Colonel Baird Smith says "I find it difficult to credit some of the statements of expenditure on relief-works. "I find it estimated in the Agra district only, and apparently on an official basis, at Rs. 13,20,000." But if Agra really employed such a vast number of labourers as 75,000 daily from March to June, this estimate does not appear excessive.

[2] This is the figure given in Mr. Patterson's Settlement Report, page 33. Mr. Girdlestone says Rs. 7,368.

[3] Colonel Baird Smith (II. 31) says that "it was specially noted that of the 80,000 paupers employed or "supported by the magistrate of Agra a very large proportion was of small proprietors."

[4] B. S. II. 32.

expect deniency. But the collector could not tell them unfortunately what amount of remission it was intended to allow; and whilst he was prosecuting his inquiries to determine that point, the landlords, never before having experienced or even heard of such sweeping remissions as were ultimately granted, and expecting in their most sanguine hopes nothing beyond a remission of 10 to 20 per cent. of the revenue, continued to press their cultivators for the rents; thus driving away thousands who, if unmolested, would have remained in their villages, and by means of artificial irrigation would have raised a sufficient spring crop to subsist on.

"Should the country, therefore, ever be again visited by a similar calamity, I would recommend as a first step that the total suspension of all demands for the November and December instalments should be proclaimed, provided the landlords adopted the same course towards their cultivators; and that the duty of the native revenue officer and the collector should be limited to ascertaining how far the landlords adhered to that provision, and taking of course, when they deviated therefrom, a fair proportion of the rents exacted by them from the cultivators.

"When the spring crop came into the market, it would be ample time to determine what each estate should pay. Nor is there any danger that such a course would cause undue loss of revenue. The scramble between the native revenue officer and the landlords to forestall each other in getting hold of the rents would cease, and instead of the desire to exact all he could out of the tenant the landlord would be impressed with the idea that the more lightly he dealt with his people the more considerately would he himself be dealt with by Government."

Mr. Rose's views have not, however, been accepted by the revenue authorities of the North-western Provinces, and the tendency has been more and more, in each succeeding famine, to hold out no definite promises either of suspension or remission, but quietly to postpone any severe pressure, and to collect as much as can be collected without ruining the landowners, and for the rest to wait and see what the next harvest is like. It has in effect generally been found practicable to collect the arrears of the kharif out of a moderately good rabi harvest.

15. *Permanent decrease of revenue.*—Colonel Baird Smith in his report entered into a famous disquisition on the loss of revenue caused by this famine for many subsequent years, which he attributed mainly to the want of a permanent settlement and the value it imparts to the land; and he illustrated his argument by the following table:—

| Divisions. | From 1827–28 to 1831–32. | From 1832–33 to 1836–37. | From 1837–38 to 1841–42. | From 1842–43 to 1846–47. |
|---|---|---|---|---|
| | Rs. | Rs. | Rs. | Rs. |
| Meerut | 52,28,807 | 56,54,624 | 63,81,540 | 69,05,136 |
| Rohilkhand | 64,12,554 | 58,58,664 | 55,18,641 | 63,53,941 |
| Agra | 70,56,480 | 75,01,686 | 62,55,285 | 70,34,606 |
| Allahabad | 91,63,217 | 87,87,969 | 75,16,670 | 84,00,698 |
| Benares (Goruckpur and Azimgarh only) | 17,92,438 | 24,43,719 | 29,95,416 | 34,99,065 |
| Delhi | — | 27,86,912 | 32,70,727 | — |

It is to be feared, however, that the figures will hardly bear the weight of the superstructure erected on them. The system of account seems at that time to have been very imperfect, and the preceding paragraph has shown how impossible it is to obtain correct statistical results for these years even from the source which ought to be most authentic. The decrease of revenue, if there really was a decrease, may have been due to many causes other than to the impoverishment of the land. If it was due to that cause, it was due to it in a different way from what Colonel Baird Smith supposed; that is, it arose from the fact that settlements were made for a long term in many districts almost immediately after the famine, so that the prolonged decrease of revenue does not show prolonged diminution of cultivation, but merely that the value of the land had been low at the time the settlement was made.

16. *Summary of results of the famine.*—The cost of the famine to Government and to the public, as far as we know it, may thus be summed up; but it is certain that the figures are below the mark:—

| | Cost to Government. | Cost to the Public. |
|---|---|---|
| | Rs. | Rs. |
| Relief-works | 19,60,000 | — |
| Gratuitous relief | 8,000 | 3,50,000 |
| Remissions of revenue | 95,00,000 | — |
| Total Rs. | 1,14,68,000 | 3,50,000 |

Taking the population affected at 15 millions, the cost per head was about 12 annas.

## THE MADRAS FAMINE OF 1854.

1. This famine was confined almost entirely to the Bellary District, and was severe only in the north part[1] of that district. The rains of 1852 had been unusually heavy, and the crop injured by their unseasonable character. In 1853 the south-west monsoon was light, and the north-east monsoon ended very early, and was extremely deficient in quantity, only $9\frac{1}{2}$ inches of rain falling in the whole year[2]; the harvest was reckoned to be about a half crop. The scarcity extended to the Raichor Doab and the south part of the Nizam's dominions, and there was an influx of starving people from there. Relief measures were carried out by the collector, and were confined entirely to the employment of the poor on public works. The numbers relieved rose from 9,000 in January 1854, to 97,000 in July, and mounted at one time as high as 100,600, or 8 per cent. on the entire population,[3] from which period they steadily declined, though the rains still held off and did not fall in such a way as to create confidence till October.[4] In September the expenditure on relief was so large, and the prospect of its coming to an end seemed so uncertain, that the Government deputed Mr. Maltby, a member of the Board, "to relieve "the collector of part of his responsibility in so "unexpected and pressing an emergency, by giving "his opinion on the state and prospects of the "district, and consulting with the collector and civil "engineer about the most advantageous method of "employing the people until the distress ceased, and the best means to be taken to guard "against a future similar calamity."

[2] This is the average of the returns of all taluks; in Bellary itself only 6·45 inches were gauged. The following is a statement given by Mr. Maltby, extracted from the rain register at Bellary:—

| | |
|---|---|
| 1841 | 22·08 |
| 1842 | 13·02 |
| 1843 | 19·44 |
| 1844 | 17·90 |
| 1845 | 8·45 |
| 1846 | 19·40 |
| 1847 | 18·60 |
| 1848 | 15·08 |
| 1849 | 25·05 |
| 1850 | 19·65 |
| 1851 | 14·95 |
| 1852 | 30·35 |
| Average | 18·75 |

[3] In the most distressed taluks the figures were much higher:—

| | |
|---|---|
| Bellary | 16 per cent. |
| Adoni | 17 „ |
| Gooty | 28 „ |

[4] No rain fell from January to April. From May to September only 2·75 inches were gauged at Bellary. In October 10 inches fell.

D. Appendix XXVI, 6.

2. *Prices.*—Prices rose as follows,[5] the average price of cholam (jowar) having been about 58 seers per rupee in the ten years 1841 to 1851:—

| | Prices of Cholam. Seers (of 2 lbs.) per rupee. |
|---|---|
| January 1854 | 27 |
| February „ | $22\frac{1}{2}$ |
| March „ | 24 |
| April „ | $25\frac{1}{2}$ |
| May „ | 24 |
| June „ | 21 |
| July „ | $20\frac{1}{2}$ |
| August „ | $20\frac{1}{2}$ |
| September „ | 21 |
| Average | 23 |
| Average price of paddy | 40 |
| Ditto ragi | 30 |

3. *Mortality.*—There were some severe outbreaks of cholera; but there is no mention of any famine mortality having occurred, except among the cattle, with whose bones, according to a report from Mr. Maltby in October 1854, the village lands were strewed. It was estimated that $\frac{1}{3}$ of the cattle in the whole district, or 250,000 head, perished, and in the worst parts (the northern or black-soil taluks) $\frac{4}{5}$ths of the number died. Comparing however the two enumerations of 1851–2 and 1856–7, there was an increase of only 826,000 or 0·74 per cent. on the population of the whole presidency, and this

[1] D. pp. 43–49; and Appendix XXVI., paragraph 9.

[5] D. Appendix XXVI, paragraph 7: where the "measure" used is said to be the Madras measure of 3 lbs., or $1\frac{1}{2}$ seers: thus in July 13 "measures" amount to $20\frac{1}{2}$ seers. But in paragraph 13 Mr. Maltby writes "on "July 1st cholum sold at 14 seers the rupee," and he adds in a note "this seer is equal to two-thirds of "Madras paddy." From this it seems doubtful whether the measure in the table quoted should have been taken as 2 lbs. or 3 lbs..

has been held to indicate that a considerable check to the growth of population was given by the famine of 1854.

4. *Relief Works.*—Considerable attention was paid to the organization of the relief works. They consisted almost entirely of lines of new road which had to be embanked; the only other kind of work undertaken consisted of some useful improvements in the town and cantonment of Bellary. At first they were carried on under the civil staff of assistant collectors and tahsildars; but before long seven officers from the army were sent to superintend this branch of the work, and from that time only a few minor roads were left in the charge of tahsildars. These officers were placed under the collector's orders, but were subordinate in professional matters to the civil engineer, Major Henderson, who drew up a manual of rules for their guidance. From this manual it appears that piece-work rates were unknown, and that he relied for securing the execution of a full task on a complete organization of the gangs, and on constant supervision. The wages given were at first 2 annas for men and 1½ annas for women and children: in July they were reduced to 1¼ annas for men, 1 anna for women, and 8 pies for children. Under the civil officer it had been found impossible to pay wages oftener than once in four days, and they were generally paid once a week; but this was considered by Major Henderson a hardship, and he directed payments to be made every second or third day.[1] The work at first had been very wasteful, not being worth more, when carried on under civil officers, than ⅕ of the money paid in wages; but under this improved system the ratio of value to cost rose much higher. At the end of the famine the works were carefully measured up: 284 miles of road were completed (as far as regards the earth-work), and 88 were incomplete, and the total value at ordinary rates of the work done was found to be Rs. 4,73,300, or 38 per cent. of the sum expended up to the end of September, Rs. 12,28,270. The numbers employed were as follows:—

| | |
|---|---|
| January 1854 | 8,766 |
| February „ | 16,017 |
| March „ | 22,279 |
| April „ | 49,299 |
| May „ | 77,862 |
| June „ | 93,092 |
| July „ | 97,554 |
| August „ | 77,768 |
| September „ | 65,869 |
| Average for 9 months | 56,500 |

The average receipts were Rs. 2-6-8 per head per mensem. The applicants for employment were of all castes, principally weavers, farm labourers, and common coolies; but one-fourth were cultivating ryots with their families; the women and children were to the men in number as five to three. The total expenditure up to the end of November was estimated by Mr. Maltby as likely to be 13¾ lakhs of rupees, but Mr. Dalyell states that[2] about 16 lakhs were actually expended during the year. If to this sum is added the actual loss of revenue in 1854, 5¾ lakhs, and the prospective loss of 4 lakhs, the total cost to Government of the relief measures adopted in the Bellary District was Rs. 25,75,000. The population was then 1,230,000 souls, so that the cost of relief fell at about two rupees a head.

5. *Loss of Revenue.*—The accounts kept by the Board of Revenue show the following result:—

| | Land Revenue. | Other sources, such as excise, customs, salt, stamps, &c. |
|---|---|---|
| Collections of 1852–3 | 370,39,700 | 108,59,500 |
| Do. 1853–4 | 341,69,300 | 102,60,900 |
| Decrease | 28,70,400 | 5,98,600 |
| Collections of 1854–5 | 357,02,000 | 103,37,100 |
| Decrease, compared with 1852–3 | 13,37,700 | 5,23,400 |

[1] *Para.* 27.—"The payments are at present made weekly; but as this is too long an interval, it is desirable that it should be altered, so that the people may receive their wages every day, or at least every second or third day. Under the present system a man may have worked for several days without obtaining his hire, and should he be taken ill or die the value of his labour will be lost. But besides this, the people employed are those reduced to the lowest ebb of poverty, and who have not the means to purchase daily food at its present triple price. It is, therefore, highly desirable that this means should be given to them, in order that they may daily recruit their strength against the exposure and labour required from them. Such an arrangement, if it can be carried out, is also dictated by humanity; for it would have the effect of keeping the people healthy and fortifying them against disease, and especially cholera to which so many of them have already fallen victims."

[2] P. 48.

Of this decrease in the land revenue it is reckoned that 11 lakhs were due to the lowering of the assessments, and two lakhs due to the famine. On these data therefore it may be said that the loss to the State income caused by this famine amounted in the two years to about 42½ lakhs of rupees.

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## THE FAMINE OF 1860–61 IN THE NORTH-WESTERN PROVINCES AND PUNJAB.

The materials for this note are collected from Colonel Baird Smith's two reports, dated 25th May and 14th August 1861 (referred to as B. S. I. or II.); Mr. Girdlestone's History of Past Famines G.) in the North-Western Provinces (Allahabad, 1868); and Major Wace's Summary of the Punjab Replies to Chapter I. of the Famine Commission's questions.

*Cause of the Famine.*—The seasons of 1858 and 1859 had been unfavourable, and in 1860 the rainfall was both extremely deficient and ill-timed. The monsoon did not begin till the middle of July, there was then for a few days a fairly abundant downfall, but it was followed by a month's cessation; in the middle of August there was again a week of rain, and after that hardly any fell. The consequence was an almost complete failure of the kharif or rain crop, and the ground was left so dry that it was hardly possible to sow the rabi or spring crop without artificial irrigation to moisten the ground. The winter rains also were extremely deficient, so that not only was the area under the spring crop smaller than usual, but also the crop on it was very scanty, except where the field could be watered by the wells or canals.

2. *Rainfall.*—The following statement shows the rainfall registered in the North-West Provinces at each district head-quarters during the summer monsoon and during the following winter :—

RAINFALL of 1860–61 (COLONEL BAIRD SMITH'S Chart III).[1]

| Districts. | Monsoon Rain. | | Winter Rain. | |
|---|---|---|---|---|
| | Average. | Fall of 1860. | Average. | 1860–61. |
| Saharanpore | 83· | 11·5 | 14·2 | 2·2 |
| Muzaffarnagar | 24·8 | 9· | 9·5 | 1· |
| Meerut | 17·3 | 6·6 | 4·6 | 1·4 |
| Bulandshahr | 16·8 | 8·1 | 4· | 0·7 |
| Aligarh | 20·9 | 14·2 | — | 1·2 |
| Muttra | 16·4 | 11· | 1·8 | 1·5 |
| Agra | 17·8 | 9·5 | 1·7 | ·4 |
| Mainpuri | 21·6 | 11·8 | 3· | ·9 |
| Fatehgarh | 21·1 | 13·9 | 3·6 | ·8 |
| Etawah | 25·9 | 27·2 | 2·6 | ·0 |
| Bijnor | 32·7 | ? | 8·4 | 1·7 |
| Moradabad | 23·8 | 22·8 | 6·3 | ·9 |
| Budaon | 26· | ? | 4·1 | ·6 |
| Bareilly | 32·7 | 18·7 | 5·2 | ·9 |
| Shahjehanpur | 24·9 | 27·2 | 5·9 | 3· |
| Cawnpore | 21·7 | ? | 2·4 | 1·6 |
| Hamirpur | 28· | 20· | 2·8 | 2·3 |
| Banda | 33·5 | 12·3 | 1·9 | ·4 |
| Fatehpur | 19·2 | 15·7 | 3·1 | ·2 |
| Allahabad | 36·4 | 32· | 6·2 | ·9 |

No such registers appear to have been kept up at that time in the Punjab. The Administration Report for 1860–61, paragraph 238, contains the following remarks on the subject: "the average fall of rain throughout the province is reported to have been "33·8 inches in 1860–61, to 57·2 in 1859–60. The registration of the gauges is "not yet made so carefully as to entitle the results to implicit belief. The failure of rain

[1] The "average" figures are those given by Colonel Baird Smith, and represent the inaccurate state of our knowledge at the time. The figure for Saharanpur is especially wrong. The true averages, as stated by the Meteorological reporter to the Government of India (1876) will be found in a corresponding table attached to the History of the Famine of 1868–69.

" seems to have been complete in September and October, and in December and " January."

3. *Extent of the Area and Population affected.*—The area which this drought afflicted was well defined and not large. Speaking broadly, it consisted of the upper part of the North-West Provinces and the adjoining districts of the Punjab lying between the Sutlej and Jumna, and its blackest portion was the tract along both banks of the Jumna between Delhi and Agra. Colonel Baird Smith divided it into three parts: the eastern tract contained three districts of Rohilkhand, Bijnor, Budaun, and Moradabad; the central tract consisted of the Doab districts as far down as the borders of Faruckabad and Etawah, which lay outside of it, and including only two parganas of Mainpuri; in the western tract which lay across the Jumna, the northern part of Delhi, Panipat, Thanessar, and Umballa, were but slightly affected, but the southern part of Delhi, Gurgaon, Muttra, and one pargana of Agra were visited very severely. It appears, too, from the Punjab reports that the Rohtak, Hissar, and Sirsa districts suffered almost as much as the Delhi division. The accompanying map shows the limits of the famine tract. It is copied from the one in Colonel Baird Smith's report, with only the modification of including the Hissar division, to which he makes no reference. Beyond its confines lie a ring of districts which did not suffer severely from the loss of their crops, but which were invaded by fugitives escaping from the famine area and had their stocks depleted by exportation. The relief given in these districts (as, for instance, Bareilly, Shahjehanpur, Faruckabad, Etawah) was mainly gratuitous relief to the helpless.

4. *Condition of the surrounding Countries.*—The neighbouring countries round about this tract were, on the whole, well off. The Rajputana States to the south-west shared to some extent in the drought, and Ajmir was slightly visited[1]; but the countries south of the Chambal, the Allahabad and Benares divisions of the North-Western Provinces, Oudh, and the Jalandhar and Bari Doabs of the Punjab, all had good crops and sent their surplus to supply the deficiency in the famine districts.

5. *Affected Area and Population.*—The following table was drawn up by Colonel Baird Smith to show the area and population affected by famine:—

| Tract. | Population effected. | | Cultivated Area in Acres. | | |
|---|---|---|---|---|---|
| | Entire Tract. | Worst part. | Ordinarily cultivated. | Unproductive. | Balance productive. |
| Eastern (Rohilkhand) - - | 2,856,000 | 970,000 | 2,724,000 | 926,000 | 1,798,000 |
| Central (Doab) - - - | 5,353,000 | 2,258,000 | 5,054,000 | 2,026,000 | 3,028,000 |
| Western (trans-Jumna) - - | 4,879,000 | 2,220,000 | 4,515,000 | 1,505,000 | 3,010,000 |
| Total - - - | 13,088,000 | 5,448,000 | 12,293,000 | 4,457,000 | 7,836,000 |

As regards population, the figures agree with Colonel Baird Smith's estimate of the severity of the calamity; in Rohilkhand one-third of the people inhabited the tracts most afflicted by drought; in the Doab two-fifths; in the trans-Jumna tract one half. The calculation of the unproductive area is necessarily more uncertain, and it hardly agrees with the author's view of the relative incidence of the calamity, as in each tract the proportion unproductive is nearly the same, or one-third of the whole. To " dis- " criminate the differing degrees of intensity with which different parts of the famine " tract have suffered," was, as he says,[2] a matter of peculiar difficulty, because both the summer and winter showers had been extremely local and irregular, and while the crops in some villages had been totally lost, adjoining villages had had enough rain to mature them. But speaking generally, the moist soil of Rohilkhand suffered least, and though crops were scanty, there was but little land entirely unproductive. In the south part of the trans-Jumna tract wide areas were altogether waste, with only a little cultivation round the wells and the village sites. In the Doab the unirrigated fields were almost as bad, but the oases of irrigation were larger and more frequent.

[1] Alwar felt this drought even more severely than that of 1868, and it is still remembered there as the "Athsira" from wheat having sold at eight seers (Gazetteer, p. 99). A good season in Marwar enabled that State to send in supplies to Ajmir. (*Ajmir Gazetteer*, p. 89.)

[2] I. 7–8.

6. *Degree of Loss caused by the Famine to Agriculturists.*—An attempt was made by Colonel Baird Smith to estimate the amount of loss experienced by each famine district.[1] He had not received all the information he required when he wrote his report, and in some other respects the estimate seems to be defective, but still it is of great interest and value—

| District. | Cultivated Area[2] in 1853. | Ordinary Value of Produce in lakhs of Rupees. | Area of severest Loss. | Ratio of Loss. | Amount of Loss in lakhs of Rupees. |
|---|---|---|---|---|---|
| Saharunpur | 774,000 | 45 | ·3 | $\frac{1}{3}$ | 15 |
| Muzaffarnagar | 670,000 | 35 | ·5 | $\frac{1}{3}$ | 12 |
| Meerut | 908,000 | 54 | ·4 | $\frac{1}{3}$ | 18 |
| Bulandshahr | 715,000 | 33 | ·3 | $\frac{11}{30}$ | 12 |
| Aligàrh | 961,000 | 58 | ·4 | $\frac{43}{100}$ | 25 |
| Mainpuri ($\frac{1}{4}$) | 172,000 | — | ·2 | — | 11 |
| Total Central Tract | 4,200,000 | — | — | — | 90 to 100 |
| Bijnor | 590,000 | — | ·3 | — | 12 |
| Moradabad | — | — | ·4 | — | 20 |
| Budaun | — | — | — | — | 15 |
| Total Eastern Tract | — | — | — | — | 45 to 50 |
| Delhi | 263,000 | — | — | ·66 | 60 |
| Gurgaon | 896,000 | — | — | ·66 | |
| Agra | 733,000 | — | ·3 | ·66 | |
| Muttra | 747,000 | — | ·6 | ·66 | |
| Total Western Tract | — | — | — | — | 80 |
| Grand Total | — | — | — | — | 225 lakhs (about). |

The details of the calculation are not given, but the average value of produce per acre in an ordinary year, which is taken at from five to six rupees per acre, is evidently too low.[3] Nor is it clear if the value lost is always calculated at ordinary or at famine prices. For Moradabad alone Mr. J. Strachey's estimate is given, that the cultivated area decreased in the ratio of 57 to 53, and that the outturn had fallen from seven to four million maunds. Three million maunds at ordinary prices (say 30 seers per rupee) would be worth four million or 40 lakhs of rupees; but on account of the high price of the remainder the loss is put down as 20 lakhs. It is obvious, however, that so far as those who raised the crops were forced to consume and were unable to sell them, they did not profit by the high prices, while they lost three million maunds at famine rates, say 12 seers per rupee, would have fetched 100 lakhs of rupees or one million sterling. Thus there are many different ways of calculating the losses due to famine, and it is necessary to define precisely the data of any such calculation. But speaking generally, it may be concluded that Colonel Baird Smith held the loss in Rohilkhand and the Doab to be about one-third of the crop, and in the southern part of the trans-Jumna tract to be about two-thirds. It may generally be assumed that half a crop will feed the population at a pinch, and therefore a loss of one-third does not imply an absolute insufficiency of food.

7. *Loss of cattle.*—The loss of cattle he estimates[4] at 600,000 head, worth 75 lakhs of rupees. The estimate is framed in this way. In Meerut, $\frac{4}{10}$ths of the district was

[1] B. S. I. 25—27. [2] B. S. II. 52.

[3] A calculation based on the same data as are used in that made for the famine of 1868–69 would give the following results:—In the districts named above, with a population of 11 millions, the ordinary production of food grains in an average year is about 79½ millions of maunds, worth, at ordinary prices, 127 millions of Rupees. Of this crop in 1860–61, 34·9 millions of maunds, worth, at ordinary prices, 56 millions of Rupees, or, say, 5,600,000*l.*, were lost, and this is exclusive of the loss of non-food crops, cotton, indigo, sugar, &c. The balance of food crop raised, or 44½ millions of maunds, was, however, sufficient to feed the 11 millions of people at four maunds per head per annum. There was just food enough, therefore, in the country if it could be properly distributed among the classes who had to buy it.

[4] B. S. I. 24.

acutely visited by drought, or 320,000 acres, requiring 80,000 pair of bullocks to plough: of these it is believed by the local authorities that half had died, or 40,000 pair, or 80,000 head of cattle. At this rate, in the whole central tract, about 400,000 had died, worth 50 lakhs of rupees. In Rohilkhand he considered that there was no such mortality: but in the trans-Jumna the loss was relatively greater than in the Doab, and might be estimated at 200,000 head or 25 lakhs of rupees. The data for this calculation are evidently slight, but no one who knows what the mortality among cattle is in a drought would say that the estimate is excessive.

8. *Prices and importation.*—The following table[1] shows the average recorded prices for wheat at the nine principal stations in or near the famine tract:—

| | | Seers per Rupee. |
|---|---|---|
| June | 1860 | 18·9 |
| July | „ | 16· |
| August | „ | 10·12 |
| September | „ | 10·13 |
| October | „ | 10·8 |
| November | „ | 11·4 |
| December | „ | 10·4 |
| January | 1861 | 9·15 |
| February | „ | 10·12 |
| March | „ | 12·2 |
| April | „ | 15· |
| May | „ | 15·3 |
| June | „ | 13·13 |
| July | „ | 14·6 |

The Punjab prices[2] are not given for each month, but for two dates in the year. The following were the Delhi rates for wheat flour, which is a little dearer than wheat:—

| | | Seers. |
|---|---|---|
| 1st January | 1860 | 21 |
| 1st June | „ | 18 |
| 1st January | 1861 | 7 |
| 1st June | „ | 12 |

In some of the worst tracts[3] of the North-Western Provinces the prices were as high as from $7\frac{1}{2}$ to $8\frac{1}{2}$ seers per rupee till importation in February and March brought down the rates. This importation was very brisk. It was calculated that by the end of March three million maunds had passed along the Grand Trunk Road from the east; and Colonel Baird Smith[4] estimated that altogether five million of maunds or 180,000 tons had been imported.

9. *Comparison of* 1861 *and* 1838.—On the whole, Colonel Baird Smith's conclusion was[5] that the natural seasonal calamity of 1860 was greater than that of 1837; it was preceded by a series of more unfavourable years; it affected a larger area, and prices reached a higher figure. On the other hand, the people were more prosperous and more wealthy; the settlement of the land revenue had imparted a new value to proprietory rights and had given stability to the agricultural classes; and the extension of irrigation by wells and still more by canals had provided a considerable amount of protection against the vicissitude of the season. From these facts it results that the loss of life and property was much less, and that the famine of 1861 ranks far lower in the catalogue of calamities than the famine of 1838.

10. *Measures of relief taken by Government.*—The first note of alarm[6] was sounded by the Lieutenant-Governor of the North Western Provinces, Sir G. Edmonstone, who in a circular, dated 18th July 1860, warned his officers that if the failure of the monsoon which seemed imminent should take place, serious and general distress must follow; and it would be necessary to provide employment for the famine-stricken people, to which end useful and remunerative schemes of work should be prepared, and arrangements made to open such works when the necessity declared[7] itself. The principles on which relief was to be administered were thus formulated: 1st, that none but the very old, the very young, and the infirm, who were absolutely unable to work, should receive food gratuitously; 2nd, that work should be concentrated as much as possible, so as to

[1] G. pp. 94 and XXXII. Some errors of calculation have been corrected.
[2] W. page 53. [3] B. S. II. 29.
[4] G. p. 95. B. S. II. 82. [5] B. S. II. 32. [6] G. p. 71.
[7] Instructions to the same effect were also issued by the Lieutenant-Governor of the Punjab.

facilitate supervision and check; 3rd, that only those works of permanent utility should be undertaken which were capable of being completed within a short time; 4th, that as the object was to save people from starvation, and not to attract those who could get employment elsewhere, the rate of daily wages should be kept at the lowest possible scale. The proportion generally adopted was :—

| | A. | P. |
|---|---|---|
| For a man - - - - - | 1 | 6 |
| For a woman - - - - - | 1 | 0 |
| For a child - - - - - | 0 | 6 |

"But besides providing for the able-bodied, it was necessary to take into consideration the multitudes of infirm, old, and very young persons who in a season of scarcity are most dependent on the State. In their behalf magistrates were desired to invite subscriptions and donations, and Government undertook to double whatever was obtained."

11. *North-Western Provinces system of relief works.*—The special relief offered to the able-bodied or rather to those who were not absolutely disabled from working was concentrated on ten important works. The following table[1] shows the average monthly numbers employed on each of these, and the total cost :—

RELIEF WORKS.—AVERAGE MONTHLY NUMBER.

| WORKS. | December. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | TOTAL. | Cost. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Rs. |
| Mohan Pass - - | 1,054 | 8,970 | 16,136 | 14,755 | 9,268 | 15,690 | 16,922 | 11,514 | 2,709 | — | — | — | 97,018 | 2,45,407 |
| Hapur-Garmukhtesar Road | — | 1,725 | 531 | 1,015 | 201 | 1,155 | 1,766 | 1,782 | 1,185 | — | 245 | — | 10,355 | 55,652 |
| Hindan Diversion - - | — | — | 105 | 1,697 | 3,240 | 3,523 | 3,831 | 1,827 | 538 | — | — | — | 14,761 | 34,795 |
| Fatehgarh Branch Canal - | — | 550 | 2,734 | 3,368 | 3,908 | 8,369 | 9,272 | 7,263 | 4,949 | 3,723 | 3,108 | 1,319 | 563 | 1,37,808 |
| Bulandshahr do. - | — | — | — | — | — | 7,194 | 7,272 | 11,342 | 10,057 | 7,564 | 6,104 | — | 49,533 | 1,54,390 |
| Rohilkhand Irrigation Works. | — | — | — | — | — | 656 | 791 | 1,200 | 1,148 | 618 | 207 | — | 4,620 | 11,665 |
| Bareilly-Budaun Road - | — | — | — | — | — | 234 | 1,436 | 1,436 | 1,938 | 941 | 805 | — | 6,850 | 29,424 |
| Agra Special Works - | — | 4,091 | 2,550 | 2,723 | 1,923 | 1,352 | 1,707 | 1,623 | 1,127 | 779 | 295 | — | 18,140 | 89,032 |
| Shekoabad Road - - | — | — | — | — | — | 378 | 369 | 195 | — | — | — | — | 942 | 6,000 |
| Ajmir Road - - - | — | — | — | — | — | 80 | 423 | 57 | 25 | 30 | 7 | — | 622 | 2,408 |
| Total - - | 1,054 | 15,336 | 22,106 | 23,558 | 19,240 | 38,631 | 43,789 | 38,299 | 23,676 | 13,625 | 10,771 | 1,319 | 251,404 | 7,67,591 |

The highest number employed in any one month was 44,000,[2] and the average number relieved daily during the 10 months in which the works were chiefly open was 25,140. The average cost was Rs. 3-0-10 per head per mensem. Including the cost of establishments the outlay was Rs. 9,14,294, or Rs. 3-10 per mensem per labourer relieved.

12. These relief-works were carried out by the officers of the Public Works Department, a civil officer being associated with the professional engineer on the largest work, the road through the Mohan pass, in order to assist in the arrangement of the camps, the supply of food, &c. The system pursued as to tasking the labourers, and the views entertained as to the advantages of relief given in return for labour, as compared with gratuitous relief, are explained in the following extract from Colonel Baird Smith's Report (I pp. 17-18) :—

"All people then willing to give labour in exchange for wages are admitted on these works. The wages given are calculated at the lowest rate needful for subsistence, and for that only. Profit on labour that is not wanted, but is a mere drug in the market, is wholly out of the question. It is in a pecuniary sense even at least a very expensive method of working, for the average capacity of the workers is much below that of ordinary labourers, and the cost of work so executed must always be high. But no middle course exists between employing those people and maintaining them. They certainly cannot support themselves, and it is better far to accept the high rates of work consequent on their employment than to let them subside into the class of helpless poor or die. It is clear that on special relief-works no specific rates can possibly be fixed. They must range from very nearly the entire cost of subsistence to the rates due for ordinary labour, according to the comparative working capacity of the people employed, and may at any time show fluctuations dependent on this capacity alone, and thus be wholly beyond the control of the officer in charge. Some officers have tried to work

[1] Compiled from Appendix V. G.

[2] This figure disagrees with the estimate made by Colonel Baird Smith (I, 18), according to which, at the end of April, 143,500 were employed on all the special relief-works, about 80,000 of these being in the North-Western Provinces and the rest in the Punjab. It seems clear that he received inaccurate information as to these numbers.

within limiting rates, but it is only practicable to do so systematically by overlooking the fact that wages on special relief-works are subsistence wages only, and cannot be retrenched for short work without starving the work-people. It is remarkable, however, how well and cheaply, amid all the difficulties of the case, an energetic officer can execute special relief-works. But this comparatively satisfactory result cannot be obtained by reducing wages. It depends on close personal supervision, on the careful adjustment of tasks to strength, in the formation of working parties, so that the strong and the weak may each have just the kind or quantity of work they are best fitted to do. In this way the best may be made of the system, but at best it will never be an economical one. It, however, returns in labour a sensible proportion of the cost of maintaining the people, and, what is perhaps of more importance, it teaches them to continue reliance on their own capacity to work as their best means of subsistence, and maintains their self-respect by keeping them above the position of helpless paupers.

"In reviewing this plan of relief I am satisfied that it has proved a most healthy and satisfactory success. The worst parts of the famine tract have been traversed by long lines of works, or by smaller detached works, to which the suffering people have freely resorted. They have left them, too, whenever the ordinary farming work of the country required their presence.

13. *Value of the works.*—Regarding the value of the work executed, Colonel Baird Smith says[1] that the usual rate for the work he witnessed doing in the Mohan pass was Rs. 4 per thousand cubic feet, while the actual cost was estimated at Rs. 16·2. Mr. Girdlestone says[2] (speaking of the relief-works in general) that earthwork which would usually be paid for at Rs. 1-6 per thousand cubic feet cost treble the sum, and the Lieutenant-Governor said that he should be satisfied if it could be done for Rs. 3 per thousand cubic feet. No calculation seems to have been made at the end of the famine of the actual value of the work executed.

14. *Other relief-works.*—Besides the special relief-works the ordinary works of construction and repair were carried on by the officers of the Public Works Department and the Local Fund Department according to the sanctioned budgets of the year at the ordinary rates of task-work and pay, and these employed, as estimated by Colonel Baird Smith,[3] about 40,000 to 50,000 people. Further the district officers were allowed to open some small local relief-works for the sake of people who were not able to travel to the large relief-works, but were not so physically infirm as to justify their reception in the poor-houses. In order, however, to avoid the danger that able-bodied people might be withdrawn from the larger works or might refrain from going there, "as no native "who could obtain an anna and a half a day within easy reach of his own door would go to a distance for a like or even for a larger wage,"[4] it was provided that on these local works only cooked food should be given and no money wage. The total sum expended in this way was only Rs. 29,918, which at the outside could not provide for more than 15,000 labourers for one month. These works were chiefly carried on in the Meerut District.

15. *Punjab Relief Works.*—The special relief-works in the Punjab were placed under the Public Works Department, and the total sum expended on them was Rs. 3,25,106. No information is on record as to the numbers of persons employed on them,[5] but assuming that the wages given were the same as in the North-Western Provinces, this sum would represent the cost of 90,000 persons employed for one month, or an average of 9,000 employed daily during the 10 months from January to October inclusive.

16. *Gratuitous Relief for the helpless, North-Western Provinces.*—The other great class of sufferers from famine were defined[6] as consisting of the helpless from disease, age, infirmity, or other causes, women deserted by their husbands and left with infant children, children deserted by their parents or orphaned by the famine. The support of these unfortunates was considered to be the duty of the public, and subscriptions were invited for this object, to which Government undertook to contribute an equal sum. The principal method adopted for their relief was to open poor-houses for their reception and to distribute cooked food to them. Only two exceptions were found by Colonel Baird Smith in which a different procedure was adopted:[7] "At Fatehgarh rations of "uncooked food were being issued, and at Delhi I found money was distributed at one "of the places of relief, paupers coming twice weekly and receiving a sum, graduated "according to the number of the family, for their support during the intermediate time. "Unhappily the latter plan is so provocative of abuses, notwithstanding the most "anxious care to prevent them, that I do not think it ought ever to be resorted to. In "fact, it is as a corrective of, or a preventive to, abuses that the supply of cooked food "works so well, and excepting in very special cases, and under very peculiar circum-

[1] B. S. II. 4. [2] G. p. 74. [3] I. 19. [4] G. p. 79.
[5] W. page 39. [6] B. S. I. 13. [7] I. 14.

" stances, I am satisfied it should be rigidly adhered to. I found an absolute unanimity " on this point among Native Committees, and as all personal details connected with " the food are left exclusively to them, the plan has not in my experience been the " subject of a single complaint."

Rations vary, but the following are averages :—

| | |
|---|---|
| For men and women with infants | 16 oz. bread.<br>4 „ vegetables. |
| For women and lads | 12 „ bread.<br>4 „ vegetables. |
| For children above 10 | 12 „ bread.<br>2 „ vegetables. |
| For children below 10 | 8 „ bread.<br>2 „ vegetables. |

17. The poor-house established by Mr. (Sir) J. Strachey at Moradabad, with the special assistance of Syud Ahmed Khan, C.S.I., has since been considered the model of what such an institution should be, and the following extract from Mr. Strachey's Note will give sufficient explanation of the system on which it was worked :—[1]

" On the 31st May 2,372 persons were employed in the poor-house in various simple occupations. The working paupers, as already mentioned, are divided into parties, each containing two hundred persons, and each having its separate enclosure and sheds. One or more paid servants superintend the operations of each party, and instruct the paupers in their work. Much of the work of superintendence is, however, done by inmates of the poor-house itself. All working paupers are expected to be present in the places assigned to them at 6 o'clock every morning. They work till 11 A.M., they then rest for about two hours, and during this time they receive their food. They then again work till 4 P.M., when the employment for the day is ended. In the morning each person has a certain task allotted to him. Thus, in the rope manufactory a certain quantity of 'babar' is given to each person, sufficient for the day's work. Each woman employed in spinning receives in the same way a basket containing cotton-wool, which she is expected to return in the evening spun into thread."

" The following statement shows the nature of the work carried on in the poor-house on the 31st May, and the numbers employed in each occupation :—

| Nature of Work. | Men. | Women. | Children. | Total. |
|---|---|---|---|---|
| Cotton-spinning | — | 414 | — | 414 |
| Cloth and Newar manufacture | 28 | 16 | 5 | 49 |
| Durri ditto | 9 | 15 | — | 24 |
| Rope-making | 445 | 302 | 213 | 960 |
| Grinding corn | 1 | 303 | — | 304 |
| Road-making | 237 | 33 | 47 | 317 |
| Building sheds and occupations connected with poor-house. | 276 | 28 | — | 304 |
| Total | 996 | 1,111 | 265 | 2,372 |

" These operations were undertaken without any idea of profit, and even if they had been carried on at a loss they would not the less have been expedient. But in a merely economical point of view the results have been very satisfactory. It is not possible for me at present to give detailed accounts of expenditure and receipts, but the following statement is believed to be approximately correct. It will serve to give an idea of the results of the operations carried on during the month of May. It must be understood that this statement shows only the expenditure incurred in the workshops. The whole of the charges for feeding the paupers employed, and for the ordinary expenses of the poor-house, are separate. It would equally have been necessary to maintain these paupers had no work been performed ; consequently the last column of the following statement represents a real, and not an imaginary, profit. As, however, a considerable part of the articles prepared were not actually sold during the month, but were in store on the 31st May, the entries in columns 5 and 6 are subject to future correction. There is no reason for supposing that the receipts will be less than the amount given in the statement ; but should they fall below the estimate, it will not the less have been shown that, even on purely economical grounds, the employment of the pauper is desirable. We may consider that during the month of May the expenses of the poor-house were less by Rs. 712-1-3 than they would have been if no work had been carried on :—

[1] G. pp. 77-78.

STATEMENT showing the EXPENDITURE and ESTIMATED RECEIPTS on account of the MORADABAD WORK-HOUSE for May 1861.

| 1. Nature of Employment. | 2. Articles prepared or work performed. | 3. Quantity of Articles prepared. | 4. Expended on account of Work-house for Raw Materials, &c. | 5. Estimated Value of Articles prepared. | 6. Estimated Profit. |
|---|---|---|---|---|---|
| | | Mds. S. C. | Rs. A. P. | Rs. A. P. | Rs. A. P. |
| Rope-making | Rope | 475 9 12 | 494 15 2 | 768 2 3 | 273 3 1 |
| Cotton-spinning | Cotton thread | 28 38 5½ | 396 1 0 | 481 2 6 | 85 1 6 |
| Durri-making | Durris | 43 in No. | 32 14 3 | 48 8 0 | 15 9 9 |
| | | Mds. S. C. | | | |
| Newar-making | Newar | 0 24 7 | 10 1 10 | 10 9 0 | 0 7 2 |
| Cloth-making | Coarse cotton cloth | 75 pieces. | 43 3 3 | 47 3 3 | 4 0 0 |
| Grinding corn | Flour | — | 8 12 5 | 148 4 2 | 139 7 9 |
| Road-making, &c. | Repairs to road and earth work. | — | 4 12 0 | 199 0 0 | 194 4 0 |
| Total | | — | 990 11 11 | 1,702 13 2 | 712 1 3 |

18. It is not possible to state with accuracy the number of people supported in these poor-houses, the reports of the time being defective, and in some cases obviously incorrect. This form of relief appears not to have commenced (except perhaps in a very modified form) till January, in which month about 3,800 persons were fed daily in the Doab Districts and in Agra and Muttra. In the Rohilkhand Districts some 2,000 were fed daily in February and 11,000 in April, and at the end of that month Colonel Baird Smith found[1] that 101 poor-houses were open, and he estimated that 80,000 people were relieved in them. In the middle of June[2] he estimated the numbers at 140,000. In all probability[3] the total number relieved for one day in the 17 districts of the North-West Provinces may be put at 9,120,000 approximately, or 304,000 for a month, or for the nine months period from January to September inclusive an average of 33,800 a month. The total cost of their relief was Rs. 5,41,783, or Re. 1-12½ per head per month.

19. *The Central Relief Committee.*—A Central Relief Committee was established at Agra in January 1860, to which was committed the care of collecting the subscriptions of the public and distributing the money required for gratuitous relief to the different districts. They received in all from outside the Province the sum[4] of Rs. 9,28,000, of which Rs. 3,07,000 (the equivalent of 30,000*l.*) was subscribed in England and sent out by the Lord Mayor of London; local subscriptions raised in the Province amounted to Rs. 1,34,000, and Government contributed Rs. 1,02,000. This, with some miscellaneous receipts, made a total of a little over Rs. 11,80,000. Their expenditure was as follows:—

| | Rs. |
|---|---|
| Gratuitous relief | 5,42,000 |
| Local relief works | 30,000 |
| Grants for seed grain and bullocks | 3,40,000 |
| Funded for orphanages | 2,70,000 |
| TOTAL | 11,82,000 |

The amounts given for seed grain and plough bullocks were allotted to the different districts according to the estimate made of their losses, and were distributed to the cultivators by the Collectors and their subordinate officers.

20. *Pardah-nashin women.*—Another class to whom gratuitous relief was administered was the destitute Muhammadan women whom the custom of "pardah" or

[1] I. 16. [2] II. 9.

[3] Mr. Girdlestone's Appendix VII. gives the number of rations issued up to the end of October as 15,120,000: but there are certain apparent errors in the figures. In most cases the number of rations represents the number of persons relieved, and the average cost of a ration is ·95 of an anna. But in Bulandshahr 5,200,000 rations were given at a cost of Rs. 31,523, or only ·094 of an anna each; and up to the end of July in this district only 596,000 persons had been relieved. The figure 5,200,000 is evidently too large by a cypher. Similarly Muttra and Agra show excessively high numbers, which cannot be correct for the same reason. The average cost of a ration in all the districts excepting these then is ·95 of an anna, and assuming this rate for all relief, an expenditure of Rs. 5,41,783 corresponds to the issue of 9,120,000 rations.

[4] G. pp. 87, 88, and 29, 30.

seclusion prevented from coming to the poor-houses. Their cases were examined into by experienced and well-informed native gentlemen, and relief was given them on condition of their earning it by labour at the spinning wheel. Enough money to support them for a week or a fortnight was given to each, with a quantity of cotton to be spun at the rate of 2 oz. a day; on their returning this quantity spun into thread at the end of the period, they received a fresh supply. Meerut and Moradabad were the only districts in which apparently relief of this kind was given to any appreciable extent.

21. *Principles of gratuitous relief.*—Colonel Baird Smith's conclusions as to the principle which should govern the distribution of gratuitous relief are of sufficient importance to be quoted here in their entirety.[1]

"1*st.*—Relief by cooked food only, the nature of the food however being cautiously adapted to the physical strength of the paupers.

"2*nd.*—Either a careful system of selection by the personal enquiries of competent sub-committees, or permanent residence within the relief house, should be conditions of *continuous* relief. No conditions need be attached to casual relief excepting evidence of suffering from hunger, about which there is rarely any risk of error.

"3*rd.*—The principle that all who can work shall work in ways suited to their capacity should be carried out as much as possible with permanent paupers. A relief-house gradually developed into a true work-house, where the totally helpless are cared for and supported, while the partially helpless are occupied in such light work as they are accustomed to, or are fit for, is the most satisfactory form the relief of this class of paupers can assume.

"4*th.*—Relief should be interpreted liberally, and be made to include relief from nakedness as well as hunger, and from disease by medical treatment and hospital comforts.

"5*th.*—Cautious extension of out-door relief in the cases of female paupers of respectable position, by whom appearance in public would be felt as an intolerable degradation. When practicable, appropriate labour may be required in exchange for food.

"6*th.*—The extension of relief houses throughout the interiors of districts, especially in the sections of greatest intensity, wherever European or reliable native supervision can be secured."

22. *Gratuitous and other relief in* the *Punjab.*—The measures adopted in the Punjab were very similar to those in the North-Western Provinces. A central committee was appointed who collected from the public subscriptions to the amount of Rs.10,50,275, and received from Government a grant of Rs. 80,439, the equivalent of the local subscriptions. This money they distributed to the necessitous districts, first for the expenses of the gratuitous relief in poor-houses, afterwards for loans and gifts to supply seed-grain and cattle to the cultivators. Large contributions were also made to the poor-houses by Local Funds, and altogether Rs. 7,83,945 was expended on this form of relief, Rs. 6,01,498 being spent in the Delhi Division alone. There are no complete accounts of the numbers relieved. In the District of Delhi 46,000 persons are said in the Administration Report to have been daily fed; in May in the whole famine tract about 100,000 were fed daily, in June 105,000, in July 116,000, in August nearly the same; but in September the number decreased rapidly, and by the end of October hardly any paupers remained. If the rations distributed were the same and cost the same as in the North-Western Provinces, the sum of Rs. 7,83,945 would stand for the expenditure on 448,000 persons relieved for one month, or, for the 9 months period from January to September inclusive, an average of 50,000 a day. If this is at all correct the numbers must have been extremely low in the four earlier months, and must have mounted very suddenly in May.

23. *Advances to Cultivators.*—Besides the money devoted by the committee for advances to cultivators (Rs. 2,27,000) a further sum of Rs. 3,33,456 was laid out by Government, making a total of Rs. 5,60,456, and this was chiefly appropriated to the Delhi and Hissar Divisions. The money was distributed by the Tahsildars after enquiries made in each village, and their work was supervised by an Assistant or Extra Assistant Commissioner. "Without these measures," writes the Commissioner of Hissar, "the favourable rains vouchsafed would have been of little avail, the agricultural "community must have succumbed, and the ruin which has marked former visitations "of the kind would have been the inevitable consequence."[2]

24. *Emigration.*—Particular attention was paid by Colonel Baird Smith to the subject of the voluntary emigration which was going on to a great extent during his tour of inspection, and which is a measure to which the people of India have always resorted in times of scarcity. He estimated[3] the number of emigrants at about half a million. His data were based on the enquiries made by the Collectors of Muttra, Meerut, and Aligarh, in which districts the number of emigrants was calculated at 10½, 3, and 5 per cent. respectively of the population. In Muttra alone 90,000 people were found to have

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[1] I. 15. [2] W. p. 59. [3] I. 20, 23.

left their homes, and from this he estimated the emigration from the south part of the west tract at about 125,000. In the Doab he put it at about 4½ per cent. of the affected population, or 250,000. The Magistrate of Moradabad calculated the emigrants from his district to have been about 50,000; and on this ratio the number who went away from the famine tract in Rohilkhand would be about 125,000.. In this way the sum total of half a million was arrived at; and of this Colonel Baird Smith conceived that about $\frac{1}{10}$ emigrated to Foreign States, $\frac{6}{10}$ to British districts beyond the famine tract, and $\frac{3}{10}$ to famine districts less severely afflicted, and especially to the canal tracts. Some enquiries made afterwards by Colonel Brownlow[1] in the tract irrigated by the East Jumna Canal shewed that about 10,000 new immigrants had settled down in the 850 villages of that tract. On this basis Colonel Baird Smith calculated that 50,000 might have similarly settled along the Ganges, and 20,000 along the West Jumna Canal. He evidently looked on this great emigration as a healthy sign and a natural effort for self-preservation made by the people, a large proportion of whom would be sure to return home when regular seasons set in. There is no suggestion of a fear that this emigration would be likely to induce a great mortality.

25. *Mortality.*—What that mortality was there is hardly any evidence to shew. The system of registering vital statistics had not then been introduced. The Collector of Bulandshahr took some pains to ascertain how many deaths in his district were due directly to famine, and he computed the number at 24,700, or 3½ per cent. of the population. At this rate, Colonel Baird Smith says,[2] the total number of famine deaths in the central tract must have been 80,000 or 90,000. In a small area of the Delhi District the mortality was found to be 8½ per cent. of the population. This rate, he believed, would apply to the whole southern part of the Trans-Jumna tract.[3] This would give a mortality of over 200,000 on a population of 2½ millions. In the Punjab the mortality was said to have been extensive; many deaths from starvation were reported; but no estimate was made of its amount. Gurgaon during the month of June 1861 suffered from cholera, to which, says the Administration Report, many "of "the population may have been predisposed by privation." Sir A. Cotton estimated the entire mortality at 200,000 at least.[4]

26. *Suspensions and remissions of revenue.*—When the famine was first anticipated, very liberal ideas as to the collection of revenue were in vogue. The Lieutenant-Governor, North-Western Provinces, in July wrote to warn the Board of Revenue that suspension of the kharif instalments might be unavoidable, even if remissions did not ultimately become necessary.[5] Colonel Baird Smith believed[6] that the remissions of Government revenue would amount to about 40 lakhs of rupees. But in the end it seems that only 13 lakhs of rupees were in arrears at the close of the famine in the North-Western Provinces, and of those all but Rs. 2,34,646 was ultimately collected. Nothing has been publicly recorded to shew what cause induced this change in the minds of the local authorities: whether on abstract principle they decided on enforcing a more rigid collection of the Government demand than they had at first intended, or whether the recovery of the country was so rapid that they considered that the balances could be collected without distress or harshness. To the loss of revenue should be added a reduction of some Rs. 70,000 in the receipts for the year from excise.[7] In the Punjab the remissions were much larger, amounting altogether to about[8] 14 lakhs of rupees.

27. *Crime.*—The increase in the number of offences against property was not large,[9] and the orderly conduct of the people was matter of general remark in both Provinces.

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[1] B. S. II. 56.

[2] B. S. II. 7. But as the population of Bulandshahr is about $\frac{1}{6}$ of that of the whole Doab tract, the mortality in that tract might have been put, at the same ratio, at 150,000.

[3] B. S. II. 8. [4] G. page 87. [5] G. page 72.

[6] B. S. I. 27. [7] G. page 90.

[8] The exact figure cannot be given; but the "doubtful" and "irrecoverable" balances of 1860–62 amounted to Rs. 14,25,635. These were, in Major Wace's opinion, all due to the famine, and hardly any part of them was recovered. The Administration Report of 1860-61 put the deficit for that year at 11 lakhs (of which Rs. 5,55,126 were classed as doubtful, and Rs. 4,06,769 as irrecoverable, and both these sums were eventually remitted), and the year did not include the demand on account of the rabi of 1861. In 1861–62, Rs. 3,54,996 were written down as irrecoverable. Besides this, the loss on excise in the two years, as compared with 1859–60, was Rs. 2,01,080, or say, two lakhs of rupees. Mr. Girdlestone (page 90) puts the remissions at Rs. 6,74,526, quoting apparently from the report of the Secretary to the Central Relief Committee.

[9] G. p. 91. Figures for North-Western Provinces—

| | Increase in 1861 over 1860. |
|---|---|
| Dacoities and robberies | 131 |
| Burglaries | 1,508 |
| Thefts | 3,538 |

No increase was required to the strength of the police. Colonel Baird Smith considered[1] that the great contrast in this respect between 1838 and 1861 might partly be due to the influence of the military operations following on the mutiny, but more to the far healthier condition of native society now than then.

28. *Summary of results of relief measures*,—During and after July 1861 the rainfall was favourable and cultivation was resumed. By the end of October all poor-houses were closed and all relief-works stopped except one. The following table sums up the amount and cost of relief given during the continuance of the famine. Taking the whole affected population as 13 millions, the cost of all the relief measures expended on them amounted to about 7 annas a head:—

| Kind of Relief. | Duration. | North-Western Provinces. | | | Punjab. | | |
|---|---|---|---|---|---|---|---|
| | | Average No. relieved daily. | Cost to Government. | Cost to the Public. | Average No. relieved daily. | Cost to Government. | Cost to the Public. |
| | | | Rs. | Rs. | | Rs. | Rs. |
| Relief Works special | 10 months | 25,140 | 9,14,294 | — | 9,000 | 3,25,106 | — |
| Ditto minor | — | — | — | 29,918 | — | — | — |
| Gratuitous relief | 9 months | 33,800 | 2,00,677 | 3,50,392 | 50,000 | 1,60,758 | 5,22,116 |
| Grants for seed grain and cattle | — | — | — | 3,02,297 | — | 1,23,033 | 2,05,000 |
| Loss of Revenue and Excise | — | — | 3,04,646 | — | — | 16,00,000 | — |
| Funded for orphanages | — | — | — | 2·92,960 | — | — | — |
| TOTAL | — | — | 14,89,617 | 9,75,567 | — | 22,08,897 | 7,27,116 |

29. *Relief to Famine caused by Irrigation*.—There are many other points in Colonel Baird Smith's reports which are worthy of attentive consideration in their bearing upon famines,—such as his remarks on the good service done by landowners,[2] the influence of race and agricultural skill on the power to resist the pressure of famine,[3] the good effect of a moderate assessment of revenue fixed for a long period of years, &c. But the only part of his report which it seems advisable to notice more fully in this brief abstract is that in which he dwells on the benefit produced by irrigation. His remarks refer chiefly to the Doab alone. He calculates[4] the number of masonry wells at 70,000 and of temporary wells at 280,000, irrigating 1,470,000 acres; but this is the irrigation of two years, and these wells could only irrigate half the area under one crop, or 735,000 acres at a time. The Eastern Jumna and the Ganges Canal irrigated, in 1860–61, 706,000 acres.[5] The irrigation from rivers and ponds in a year of drought he estimates at two per cent. on the total area, but it is so small that it is hardly worth while taking into account. It may be said therefore that 1,450,000 acres were irrigated in 1860–61 by wells and canals. Of these acres we have the crop details for the canals, but not for wells; assuming that the ratios of food crops and non-food crops were the same in both cases, the area under food crops was 1,250,000 acres. Assuming the same ratios to exist for well-irrigated as for canal-irrigated lands, the following was approximately the area and outturn[6] of the main different irrigated crops:—

| | Acres. | Md. per acre. | Outturn. |
|---|---|---|---|
| Wheat and barley | 780,000 | 12 | 9,360,000 |
| Rice | 130,000 | 10 | 1,300,000 |
| Gram | 40,000 | 12 | 480,000 |
| Arhar, bajra, joar and miscellaneous | 300,000 | 8 | 2,400,000 |
| | 1,250 000 | — | 13,540,000 |

The total cultivated area of the Doab is approximately, at the present time, 9,500,000 acres, and may be estimated as having been about nine million[7] acres in 1860, and the population it contains was about 11 millions. The irrigated area, though only about a seventh of the total cultivated area, produced food enough for more than one third of the population, or four millions of people. Each irrigated acre produced enough to feed

[1] II. 30. [2] I. 11. [3] I. 10. [4] II. 52–53.

[5] So in Appendix IV. Ganges Canal 455,324 acres: Eastern Jumna Canal 251,153. But in the letter press of the report he states the figures as 334,088 (p. 62), and 261,327 acres (p. 57) respectively. I have assumed the tabular statements to be the more correct.

[6] The estimate of outturn per acre here applied is that adopted for the North-Western Provinces irrigated lands generally—see Provincial answers to Q. 3 of Chapter I. of Famine Commission's questions.

[7] By a curious slip Colonel Baird Smith says (page 54) it was 19 millions, which is demonstrably impossible, and which the statement on the preceding page 52 shows to be a mistake.

three people (at 1 lb. a day), and thus, on the ordinary calculation that there is about one person to each cultivated acre, the whole of the cultivation is said to be protected when a third of it is irrigated. From this point of view Colonel Baird Smith had good reason for urging the immense benefits conferred by these two canals, and the importance of carrying on the work of enlarging the means of irrigation by completing such works as are already planned and prepared, and by pushing on surveys and enquiries into the means of utilizing the other rivers, the water of which is still not turned to any useful purpose.

30. *Account of Charitable Contributions from England and elsewhere.*—As this was the first occasion on which large subscriptions were raised in Great Britain for the relief of Indian fellow-subjects suffering from famine, it may be interesting to record the amounts collected, and to show how they were expended. There seem to have been several Committees at work; and the sums they remitted, including generally a very small gain by exchange, were as follows:—

| | Rs. | A. | P. |
|---|---|---|---|
| Lord Mayor's London Committee, to Calcutta | 5,04,378 | 12 | 5 |
| Lord Mayor's London Committee, to Bombay | 5,70,105 | 4 | 0 |
| Lord Mayor's London Committee, to Agra | 2,57,440 | 12 | 6 |
| English Provincial Committee, to Calcutta | 1,63,740 | 14 | 11 |
| Edinburgh Committee, to Governor General | 1,46,318 | 4 | 3 |
| British Colonies, to Calcutta | 23,499 | 14 | 10 |
| Subsequent subscriptions sent to Calcutta | 57,401 | 1 | 3 |
| TOTAL | 17,22,885 | 0 | 2 |

or about 170,000*l.* altogether.

The Bombay Relief Committee disposed of its funds as follows:—

| | Rs. | A. | P. |
|---|---|---|---|
| Received from London as above | 5,70,105 | 4 | 0 |
| „ „ Madras subscriptions | 61,768 | 3 | 8 |
| Local subscriptions | 16,281 | 1 | 10 |
| Interest on Government paper | 1,273 | 8 | 5 |
| TOTAL | 6,49,428 | 1 | 11 |

| | Rs. | A. | P. |
|---|---|---|---|
| Remitted to Agra Committee | 1,00,032 | 12 | 5 |
| „ to Punjab „ | 3,41,241 | 0 | 0 |
| „ to Government of India (1862) in paper | 2,08,154 | 5 | 6 |
| TOTAL | 6,49,428 | 1 | 11 |

The Calcutta Relief Committee received—

| | Rs. | A. | P. |
|---|---|---|---|
| From England (as above) | 7,49,020 | 11 | 5 |
| Local subscriptions | 2,53,391 | 8 | 1 |
| TOTAL | 10,02,412 | 3 | 6 |

which they expended thus—

| | Rs. | A. | P. |
|---|---|---|---|
| Remitted to North-Western Provinces | 3,79,000 | 0 | 0 |
| „ to Chunar direct | 5,669 | 10 | 6 |
| „ to Punjab | 5,75,000 | 0 | 0 |
| Expenses | 5,025 | 6 | 2 |
| Balance made over to Government of India | 37,717 | 2 | 10 |
| TOTAL | 10,02,412 | 3 | 6 |

The Government of India thus, besides the sum received direct from the Edinburgh Committee, became the residuary legatee of all the local committees, and received from them whatever surplus remained in their hands when the work of relief was over, and no more demand was made on them. Its accounts stand thus:—

| | Rs. | A | P. |
|---|---|---|---|
| Received from Edinburgh Committee | 1,46,318 | 4 | 3 |
| „ from Bombay Committee | 2,08,154 | 5 | 6 |
| „ from Calcutta ditto | 37,771 | 2 | 10 |
| „ from North-Western Provinces, Cash | 91,211 | 10 | 11 |
| „ „ Notes | 2,70,000 | 0 | 0 |
| From Punjab | 5,58,422 | 12 | 10 |
| Interest on Notes | 1,01,184 | 13 | 6 |
| TOTAL | 14,13,009 | 1 | 10 |

This money was expended as follows:—

| | Rs. | A. | P. |
|---|---|---|---|
| Remitted in 1861 to North-Western Provinces | 50,000 | 0 | 0 |
| Remitted in 1861 to Punjab | 50,000 | 0 | 0 |
| „ to London for relief of Lancashire cotton weavers in 1863. (Equivalent of 20,000*l.*) | 1,97,105 | 12 | 7 |
| „ to Government of Bengal for Orissa famine (1866) | 6,01,400 | 0 | 0 |
| „ to Punjab in 1869 for famine relief | 1,42,300 | 0 | 0 |
| Loss on sale of Government paper in 1867 | 14,296 | 10 | 1 |
| Miscellaneous expenditure on Edinburgh Committee's Fund | 4 | 0 | 0 |
| Absorbed into the general revenues to meet the cost of providing for the orphans of the famine | 3,57,902 | 11 | 2 |
| TOTAL | 14,13,009 | 1 | 10 |

The general amalgamated account may be summarised thus—

*Receipts.*

| | Rs. | A. | P. |
|---|---|---|---|
| Subscriptions from England | 17,22,885 | 0 | 2 |
| Local subscriptions in India | 8,11,828 | 12 | 1 |
| Government donations, as equivalent, in North-Western Provinces and Punjab | 3,61,436 | 3 | 6 |
| Recoveries of advances | 2,91,032 | 12 | 2 |
| Interest on Government paper | 1,05,582 | 0 | 4 |
| TOTAL Receipts | 32,92,764 | 12 | 3 |

*Expenditure.*

| | Rs. | A. | P. |
|---|---|---|---|
| Charitable relief in North-Western Provinces, including advances for seed, &c. | 9,85,738 | 8 | 9 |
| Punjab | 9,87,874 | 4 | 7 |
| Total charitable relief in 1861 | 19,73,613 | 13 | 4 |
| Expenses of Committees, and loss on sale of Government paper | 20,443 | 7 | 2 |
| Orissa famine relief, 1866 | 6,01,400 | 0 | 0 |
| Punjab famine relief, 1869 | 1,42,300 | 0 | 0 |
| Lancashire cotton famine, 1863 | 1,97,105 | 12 | 7 |
| Taken over to meet expenditure on orphanages | 3,57,902 | 11 | 2 |
| TOTAL | 32,92,764 | 12 | 3 |

## BENGAL FAMINE OF 1865–66.

### SECTION I.—ORISSA.

[This abstract, as far as regards the events of 1865–66 (Part I.), is compiled from the Report by the Famine Commissioners, Sir G. Campbell, Colonel Morton, R.E., and Mr. H. L. Dampier (Calcutta, 1867), which is referred to in marginal quotations as "O. R." The report is partly judicial in its character, dealing with and judging the conduct of the officials of the province, but I have, as far as possible, avoided touching on these matters. All that I have attempted has been to extract the main facts of the famine, and to record the conclusions of the Commissioners as to the lessons to be learnt for future guidance from what was done, or omitted, by the Government in regard to relief measures. Some extracts have also been made from the Board's Apologia or defence of their action, in reply to the Commissioners' report. In the second part, the narrative of 1867 is partly abstracted from Mr. Geddes' "Administrative Experience in former Famines" (Calcutta, 1874), which is referred to marginally as "G.," and partly from the Report of the Relief Committee (R. C.) written by Sir C. Hobhouse, and containing subsidiary reports from Messrs. Molony, Kirkwood, and others.]

#### PART I.—TO END OF 1866.

The famine of 1866 was most intensely felt in the three districts of Orissa and in the districts or parts of districts immediately contiguous to it on the north. There were, no doubt, minor differences of degree in Puri, Cuttack, and Balasore, but these chiefly

manifested themselves in the earliness or lateness with which the extreme dearth of food set in or became known, and "eventually the tide of famine raged so high all over "Orissa that local inequalities may almost be said to have been submerged and lost "sight of in one wide-spreading sea of calamity."[1] North of Orissa the Tributary Mahals, the western half of Midnapore, a large part of Manbhum, and a third of Singhbhum, are comprised in the blackest portion of the famine tract. The area less severely affected contains the rest of these districts, Bankura, Nadiya, and Hughli. The following table gives the area and population of the famine tract, thus classified according to the information possessed at the time the Orissa report was written,[2] and a column has been added to show the population recorded by the census of 1872:

| District. | Total. | | Intense. | | Severe. | | Population by Census of 1872. |
|---|---|---|---|---|---|---|---|
| | Area. | Estimated Population. | Area. | Estimated Population. | Area. | Estimated Population. | |
| Puri | 2,697 | 588,000 | 2,697 | 588,000 | — | — | 770,000 |
| Cuttack | 3,062 | 1,293,000 | 3,062 | 1,293,000 | — | — | 1,622,000 |
| Balasore | 1,890 | 500,000 | 1,890 | 500,000 | — | — | 770,000 |
| Midnapur | 4,834 | 700,000 | 1,567 | 212,000 | 1,627 | 414,000 | 2,545,000 |
| Manbhum | 5,400 | 1,190,000 | 1,500 | 281,000 | 2,318 | 310,000 | 995,000 |
| Singhbhum | 3,998 | 289,000 | 1,250 | 162,000 | — | — | 415,000 |
| Bankura | 1,300 | 208,000 | — | — | 1,300 | 208,000 | 526,000 |
| Nadiya | 3,296 | 1,011,000 | — | — | 1,152 | 351,000 | 1,813,000 |
| Hughli | 2,007 | 1,890,000 | — | — | 500 | 482,000 | 1,488,000 |
| 24-Pergunnahs | 2,523 | 1,330,000 | — | — | 168 | 65,000 | 2,210,000 |
| TOTAL | 31,007 | 8,999,000 | 11,966 | 3,036,000 | 7,065 | 1,830,000 | 13,154,000 |

It will be seen presently that the distress felt in the last three districts of the list was of a different kind, and sprang from a different cause, from that experienced in the rest of the famine tract: in the one case it arose only from high prices accompanied by loss of employment: in the other it was due to an almost total failure of food, and involved all classes alike.

2. *Errors as to the population of the famine tract.*—It is of somewhat ominous import to observe, at the outset, that the population of these districts as ascertained by the census, even after the loss of life caused by the famine, was larger by four millions or nearly 50 per cent. than the estimate made of it by the best authorities at the time. With such wide limits of error as to the number of the people, it was impossible for any calculation of the quantity of food required for their support to be even moderately accurate.

3. *Brief history of the famine.* (1). *Its causes.*—The years preceding 1865 had not been unfavourable. The crop of 1863 was not below the average, and that of 1864, though inferior in Puri, was good in Cuttack, and particularly good in Balasore. The export trade of Orissa was considerable, and averaged 20,000[3] tons of rice a year during the six years 1859 to 1865: but in the last of these years the quantity exported was unusually large, amounting to 33,000 tons, of which Balasore alone sent away 28,000 tons. This had no doubt depleted the stocks to some extent, but in August 1865 rice was[4] selling at the normal rate of 30 to 35 seers per rupee in Cuttack, while in Puri it was as high as 18 seers. It was not till September 1865 that an alarm began to be felt about the rainfall. The following table shows the amount gauged during each month of the monsoon; but it is admitted that the instruments used could not always be relied on:—

| | 1865. | | | Average of previous 13 years, Puri. | 1865. |
|---|---|---|---|---|---|
| | Puri. | Cuttack. | Balasore. | | Midnapur. |
| May | 13· | 7·4 | 11·55 | 2·1 | 16·6 |
| June | 5·6 | 8·1 | 4·25 | 9·2 | 13·3 |
| July | 4·3 | 12·2 | 5·9 | 12·2 | 25·4 |
| August | 5·6 | 7·7 | 8·25 | 17·3 | 9·6 |
| September | 5·2 | 7·5 | 9·3 | 16·8 | 17·4 |
| October | — | — | 0·3 | 9·4 | — |
| November | — | — | — | 1·8 | — |

[1] O. R. I., 25. [2] O. R. II., 628. [3] O. R. I., 13. [4] *Ibid.* I., 15.

It appears from this that in Puri the rain was very deficient throughout (for the heavy fall of May was of no use to the crops), while in Cuttack and Balasore it was scanty, but not extremely so, till September, and it was its sudden stoppage after that which caused the evil. In Midnapur it was peculiarly plentiful till after September, when it came abruptly to an end. Thus the rice which was then just full grown withered as it stood, and no grain formed in the ear.

4. *Early anticipations.*—The first alarm was given from Puri about the middle of October, and the fact soon became generally realised both by the official and non-official community, that the premature cessation of rain must cause great injury to the harvest. A panic seized the merchants, and for a short time even retail trade was at a standstill: prices rose rapidly, till, in November, they stood at 7 seers per rupee in Puri and 8 seers in Cuttack. The collectors all applied for leave to make special enquiries into the condition of the crops, and the extent of the losses, with a view to deciding what amount of revenue should be remitted, but this was discouraged by the Commissioner, and refused by the Board of Revenue, who again later on (in January) absolutely rejected the proposal that any remission should be granted.

In the end of November the Board sent up a comprehensive report to the Government of Bengal, which was based on reports received[1] from the different Commissioners of Divisions. They stated[2] that, except in Eastern Bengal, the crop had been poor everywhere, and that the tracts which had suffered most were Orissa, especially Puri, Midnapur, and three districts in Behar, Gya, Shahabad, and Chumparum, where rice had already risen to 7 seers per rupee. Some collectors considered the crop would be $\frac{3}{4}$, some $\frac{1}{2}$, some as little as $\frac{1}{4}$ or even $\frac{1}{8}$ of an average, but such estimates could not be much relied on: the Board's own opinion was that the crop would be at least half an average one, and in Eastern Bengal not much under an average one. Such a crop would by itself provide food for the people, even though the stocks in hand might be, as they probably were, much below the usual amount; and this being the case there could be no famine. Agriculturists would gain by high prices as much as they lost by short harvest, while for the labouring and poorer non-agricultural population suffering, but not generally famine, was in store. The policy they recommended on the part of the Government was as follows:—

(1.) The publication of prices-current, in order to facilitate and encourage the operation of the natural laws, which can alone afford real relief in time of widespread scarcity;
(2.) The provision of labour for the poor by public works;
(3.) Liberal expenditure on Government estates, in order to set an example to zemindars;
(4.) As the chief, if not the only reliance in more extreme cases, local private liberality to be exercised through local relief committees.[3]

This sketch of the policy to be pursued was approved by the Government, and no further enquiries were set on foot to ascertain more accurately what the true extent of the failure was. In Orissa the crop was certainly less than a half, and is calculated by the Commissioners[4] as being altogether about one-third of an average, but in some parts the outturn was much less. Such as it was, the harvest (forced early into the market in order to pay the demands for rent and revenue which were not suspended) lowered prices considerably; at the end of December rice was at 14 seers in Puri, and 15 seers in Cuttack and Balasore.

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[1] In paragraph 98, the Commission express a doubt whether the Board had at the time received all the reports they professed to have received. The Board afterwards explained that they had received them and published abstracts of them in the newspapers, but that the reports had been mislaid and the fact had been forgotten by themselves and their secretary at the time the Commission was making its enquiries. On this the President withdrew the charge as to imperfect information.

[2] O. R. II., 31.

[3] O. R. I., 33.

[4] *Ib.*—34. The statistics of Bengal, deprived as it has been of the advantages of a cadastral survey, are too uncertain to allow of any estimate of the crops being framed which should have much value; but this is the best approach I have been able to make. The replies to the Famine Commission show that the cultivated area of Orissa under food crops is about 2,424,000 acres, almost entirely under rice, and the average outturn of a good rice crop is estimated at 15 maunds per acre. Putting it, to allow for poorer soils, at 14 maunds or $\frac{1}{2}$ a ton, the average yearly produce of food is 1,212,000 tons. The production of one-third only of an average crop implies a loss of 808,000 tons, or (at 35 seers per rupee) Rs. 26,000,000, or over $2\frac{1}{2}$ millions of pounds sterling. The crop produced, 404,000 tons, would at $\frac{2}{3}$ of a seer per head per diem (the Bengal estimate) feed 1,858,000 people for a year, or about half the population of the time. Assuming that they reduced their consumption to half a seer, the crop would feed $2\frac{1}{2}$ millions, and leave one million unprovided for. If a million perished of famine, this shows either that there were no stocks at all in the country, which is impossible, or that the quantity of the crop saved is over-estimated.

5. *The period before importation began.*—In November and December more and more urgent reports were sent up from Puri, in which district the famine first declared itself, of the extreme distress of the people and of the prevalence of deaths from starvation; and in December relief works on a small scale were started; the usefulness of these was, however, hampered by the difficulty the labourers had in buying rice with their wages. Although prices were still quoted at a low figure, the quotations were misleading, for there was hardly any rice to be bought; even in the town of Puri the collector said it would have been impossible to buy Rs. 100 worth of rice a day for any period of time; and in the district the dearth of purchasable grain was even more marked, so that, as far as "the labourers were concerned, the quoted rates might just as well be a rupee a seer; the article is not procurable."[1] By the end of January prices had gone up to $8\frac{3}{4}$ seers per rupee, at or near which rate they stood till the end of March. The necessity of importation was earnestly pressed on the Board at this time, but in vain; this subject will however be separately treated of in another paragraph. In February distress began to show itself acutely in Balasore, taking the form of an influx of starving people into the head-quarter town, and of an outbreak of grain robberies. But the extent of the impending calamity was still far from realized. The Lieutenant-Governor of Bengal visited Orissa in February and left it without having received from the local officials or the unofficial public any distinct impression as to the extremity to which the loss of the harvest and the deficiency of food or of the means which the traders possessed of importing food had already reduced the population. In a letter dated the 28th March, replying to a proposal of Sir A. Cotton's which urged the organization of a great system of Public Works, the Government of Bengal[2] denied the necessity of any such scheme; they said there was no prospect of a famine in Bengal, though there would be local scarcity and distress in some parts; and (referring to a suggestion of Sir A. Cotton's for the creation of a flotilla for the carriage of food, which they rejected) they added that "the natural fluctuation of prices had been sufficient to attract food to the districts in which it was dearest"—a complete mistake, since there was hardly any import whatever to Orissa. In April the mortality and distress became very severe in Puri and Balasore, and famine began to show itself in Cuttack which had escaped till now, owing partly to its having had a better crop and partly to the employment given and money spent by the irrigation company whose works were being carried on. In May the attention of the public in Calcutta was awakened, a relief committee formed, and subscriptions collected; but the Board of Revenue[3] still doubted whether there was any really great deficiency of food or any necessity for Government to interfere by any new measures. Misled apparently by some error, they asserted that rice was still selling in the Puri district at $9\frac{3}{4}$ seers the rupee, and argued from that mistaken premiss, the fact being that rice could hardly be bought for money. But the facts were now at last beginning to be too plain for any misunderstanding. On the 26th May the superintending engineer telegraphed that a grant to Balasore of Rs. 60,000 for relief works was no use: "we want rice;" and on the 28th the Commissioner telegraphed that the rice required for the troops, the prisoners, and the Government establishments at Cuttack could no longer be procured. On receipt of this message the Lieutenant-Governor gave way and sent orders on the 29th May that importation of rice by Government must immediately be begun.

6. *Period of importation.*—From this time the history of the famine becomes closely connected with the progress of the importations. After a little demur and unwillingness to spend too lavishly, the Board, about the middle of June, threw themselves heartily into the work, and in the end rice to the value of about 25 lakhs of rupees (250,000*l.*) was imported. But the business was not simple, and the difficulties which had deterred traders were felt with greater keenness by inexperienced officials. There are no harbours on the Orissa coast, and False Point, which offers a secure anchorage during the monsoon, was only then discovered for the first time. The main difficulty was, when the ships had brought rice to the coast, to get it unloaded and carried up to the interior; and here the flotilla recommended by Sir A. Cotton would have been invaluable. One ship after it had reached Balasore was blown out to sea again before the cargo could be unladen; in another case it took five or six weeks to carry the bags of rice by native boats from False Point to Cuttack. It was not till September that any sufficient quantity of food had reached the centres of demand. But as fast as rice came in the relief operations, paralysed for want of it, revived and multiplied. June and July were the months in which the famine was most intensely felt; but in July some centres for the distribution of cooked food were established, some in August, and in September the

[1] O. R. I., 46. [2] O. R. II., 146. [3] 22nd May, O. R. I., 86.

full number, 88,[1] were open in the three districts. The mortality was highest in August, consequent on the heavy storms of rain. "The people were then in the lowest stage of "exhaustion; the emaciated crowds collected at the feeding stations had no sufficient "shelter, and the cold and wet seem to have killed them in fearful numbers."[2] These rains were followed by floods which caused great injury to the standing crops, and prolonged the distress. In October the quantity required having been to some extent miscalculated, food ran short for a time again and relief had to be curtailed; but some relief was experienced from the scanty early crops which ripened in September, and in November the main rice crop was got in, and famine in Orissa came to an end.

7. *History of Districts adjoining Orissa.*—The history of the famine in the most affected parts of Midnapur and Manbhum corresponds pretty closely to that already described, except that in neither case were the alarming signs observed as early as in Puri. Here too there was an absolute deficiency of food, and yet the prices, though as high as four to five seers per rupee in Manbhum, afforded no stimulus to local traders. Late in the year, Government in Manbhum, and a relief committee in Midnapur, imported food, but only in small quantities; and in both tracts the extremity of famine was endured in July and August; as soon as the new crops came in all was well. In the other districts, Bankura, Burdwan, Nadiya, Hughly, and Murshidabad, the loss of crop had not been sufficient to affect seriously the agricultural population; but the high prices and the absence of purchasers were keenly felt by all artizans and labourers, and above all by weavers. These flocked in crowds to the towns, where gratuitous relief was administered; the measures taken to provide for and deal with them will be narrated presently.

8. *Prices.*—The following statement shows the course of prices during the famine period in seers per rupee[3]:—

| Month. | Puri. | Cuttack. | Balasore. | Midnapur. | Manbhum. | Bankura. | Howrah. |
|---|---|---|---|---|---|---|---|
| October 1865 - | 13 | 18 | 20 | 13½ | 17 | 15 | 14¼ |
| November „ - | 9⅝ | 11⅙ | 15⅓ | 13½ | 16 | 13⅛ | 13½ |
| December „ - | 12¾ | 12½ | 15½ | 14 | 14 | 15⅝ | 13¼ |
| January 1866 - | 11¾ | 12⅗ | 12 | 12¼ | 13 | 15 | 12 |
| February „ - | 9 | 9⅛ | 9½ | 11 | 13 | 13 | 10¾ |
| March „ - | 8⅛ | 9¼ | 9¼ | 10⅗ | 13 | 12½ | 10¾ |
| April „ - | 6 9/10 | 6⅗ | 8 | 10⅜ | 13 | 11⅞ | 10½ |
| May „ - | 6½ | 5½ | 7 3/16 | 9 3/16 | 10 | 10 | 10 |
| June „ - | 5¾ | 4¼ | 5¾ | 8 1/10 | 8½ | 7 | 10 |
| July „ - | 5⅞ | 4½ | 5⅜ | 7⅗ | 5½ | 6 9/16 | 7 5/16 |
| August „ - | 5⅝ | 5 | 4⅛ | 6¼ | 5 | 6 | 7⅝ |
| September „ - | 6⅞ | 5⅞ | 5½ | 7¼ | 5½ | 5¼ | 8⅛ |
| October „ - | 7½ | 7¼ | 8½ | 9 | 8 | 15¼ | 8 9/16 |
| November „ - | — | 12⅛ | 16¼ | 17¾ | 16 | 17 | 10 11/16 |
| December „ - | — | 12½ | 18½ | 24 | 26 | — | 17 |

The average price of rice before the famine in Orissa was about 30 to 32 seers per rupee, so that, according to these figures, the prices of February to April were from four to five times the ordinary rate, and from May to August six to eight and even ten times the average. But these figures are not altogether to be trusted[4]: the system of sending up weekly returns was a new one, introduced for the first time at the beginning of the famine, and it was entrusted to unaccustomed hands (often policemen), who did not sufficiently distinguish between what the rate was and what they thought it ought to be. They professed to give the price of the dearest and cheapest kinds of rice, but the "cheapest" rice of all was a kind of which very little entered the market, and the "common" coarse rice of ordinary consumption was not registered in the price currents. But the main cause of error was that they failed to show what was a common case—the absence of any rice at all in the market. The prices were often wholly nominal, referring to the last transaction that took place, possibly some weeks before; and throughout the famine one of the peculiar features was the absence of purchasable rice in any quantity at any market except the head-quarter towns.

9. *Mortality.*—The estimates of the mortality are all of a vague and general character, but every one agrees in thinking that it must have been enormous. Cholera (which is rarely absent from Orissa in the early part of every year) broke out with great virulence;

[1] O. R. I., 94. [2] Ibid.
[3] O. R. I., page 40, Puri, Cuttack, Balasore. Page 107, Midnapur. II., pages 632–3, Manbhum, Bankura, Howrah.
[4] O. R. I., 38–9.

and the floods of August, with the cold wet nights that preceded them, raised the deaths rate to its highest point. The Commissioners, after a consideration of all that could be said on the subject, held that an estimate that one-fourth of the population had died was not too high.[1] In 1867 particular pains were taken[2] to obtain information as to the true number of the population and the mortality that had occurred; the result was that the estimate of the population before famine (which, as shown in paragraph 1, had been 2,381,000 souls) was raised to 3,015,000; of these, 809,561 were calculated to have died, and 115,028 were missing, leaving a population of 2,086,000. That even this was far below the mark was proved by the Census of 1872, which returned the population at 3,034,000 souls. Making the fullest allowance for the return of absentees and for the natural increase of population after the end of 1867 (we know from experience recently collected, that the birth-rate must have been almost reduced to nothing in 1866 and 1867), there must have been really a population of 2,700,000 when this estimate of 2,086,000 was made. Raising the death-rate in the same proportion, the mortality must have been at least a million, and the population before the famine must be reckoned to have been 3,700,000.

For Manbhum the estimate is upwards of 18 per cent., and for Singhbhum 12½ per cent.[3] In Midnapur the collector calculated the deaths at 50,000 or 10 per cent. of the population seriously affected; and the commission think this low. For other districts no estimate is given. Putting these data together, it appears probable that in six districts alone the mortality amounted to—

| | Population. | Deaths. |
|---|---|---|
| Orissa, three districts | 3,700,000 | 1,000,000 |
| Manbhum | 995,000 | 200,000 |
| Singhbhum | 415,000 | 50,000 |
| Midnapur | — | 50,000 |
| Total | | 1,300,000 |

10. *Measures adopted by the people for their own relief.*—Of the three measures ordinarily adopted by the native population for their own preservation in times of famine, very little has to be said. Emigration does not seem to have occurred to the minds of any one, except in the form of crowding into the towns and relief centres wherever charity was reported to offer a meal. The people are apparently too stay-at-home in their habits to be inclined to go forth in a time of calamity to seek refuge elsewhere: they mostly remained in their villages and died. Irrigation was almost unknown. The company's new works were still unfinished, but a little water was supplied from one of their branches, the Kendrapara Canal. The tanks were utilized, but their scanty stores were soon dried up. As well-irrigation is unknown, the people could not do anything to protect themselves by redoubling their ordinary industry. Lastly, trade, whether internal or external, hardly existed, and no prospects of advantage stimulated either local merchants to order or distant merchants to throw in supplies. Some rice was carried by sea to Gopalpur in Ganjam, and thence brought by land to Puri. Some, but very little, came down the Mahanadi from Sambalpur in the rains. No statistics or estimates are given as to the quantities thus brought in: Mr. Chapman indeed asserts[4] (7th March 1867) that they exceeded in amount "all the costly, dangerous, and laborious Government importations by sea," but the data for the statement are not given. It is, however, plain that this may have been true without attributing any great activity to private trade.

11. *Government relief measures.* (1) *Public Works.*—The measure on which the Government in the earlier part of the famine relied chiefly, if not solely, for the relief

[1] O. R. I., p. 21.

[2] Apparently the modus operandi was to distribute tabular forms to every landholder to be filled up by him for his estate. After this was done, deputy collectors were sent to make such enquiries as they could, and especially to check the returns in every village where the loss of crop in 1866–67 was said to have amounted to a half, or where the zemindar's return seemed open to suspicion. It is admitted, however, that these zemindars' returns could not be filled up with much accuracy. The per-centage of loss in each district was shown as follows, comparing the total number dead and missing with the (supposed) total population:—

| | |
|---|---|
| Cuttack | 28·88 |
| Puri | 32·18 |
| Balasor | 33·75 |
| Total | 30·81 |

[3] O. R. I., p. 105.

[4] O. R. II., 533. See also Board's Apologia, paragraph 31. Ganjam supplied itself, and Orissa too, to some extent, from the south, and the importations from Sambalpur and Chatisgarh were considerable and invaluable.

of distress, was the opening of public works. These were of two kinds: some were carried on by the Public Works Department; and some by the collector, as manager of Government estates. First of all five lakhs of rupees were granted by the Government of India for the carrying on of famine works, including feeder roads in Cuttack and Behar, but no part of this money was spent in Orissa. In December two important roads were undertaken in the Puri District; but the relief thus given was disappointingly small. There were two reasons for this: when the works were begun the collector arranged with the executive engineer that they should be carried out on the principle (1) that work should be paid for by daily wage and not by the piece; (2) that it should be paid for in grain and not in cash. To this second proposal, however, the chief engineer and the local government demurred,[1] declaring it to be undesirable for its officers to be concerned in any such arrangement, and that it was their business to pay money wages, leaving the civil authorities or local committees to manage "any further relief." It was, however, found impossible to make any such arrangements or to provide in any way for the supply of food from the local markets; and the Commissioner, on the 31st January, reported that the works were at a standstill for want of rice, and asked urgently for leave to import.[2] The Board, however, peremptorily refused permission. "The Government decline to import rice into Puri. If the market favours importers, "rice will find its way into Puri without Government interference, which can only do "harm. All payments for labour employed to relieve the present distress are to be in "cash."[3] In consequence of this, the Commissioner directed that wages on relief-works paid for by charitable funds must also be in cash, and that even the distribution of cooked food to the destitute and helpless must be stopped. At the same time, the superintending engineer was impressing on his officers the necessity of husbanding their resources, as it was probable that worse distress was coming: and they were to refuse to employ any one who was not visibly and really in want. He allowed them, however, to pay the labourers either by daily wages or by piece-work according as they (the labourers) might prefer; and he definitely refused to permit the system of petty contracts. Later on, however, finding that it was extremely difficult to compel the labourers to do a fair amount of work, the system of payment by piece-work was introduced. The rates were apparently insufficient to enable the people to earn a livelihood.[4] But even if this objection had not existed, the impossibility of providing food for the labourers would have prevented the public works from being of any great utility. The irrigation company all this time was paying its own labourers part of their wages[5] in imported rice, and the consequence was that they attracted large numbers of workmen, and employed on an average about 9,000 people daily, from January to June. In the rains, when the difficulty about providing rice had partly been overcome, the weather was opposed to the successful management of relief-works, and the numbers still continued very small. The following table embodies all that can be ascertained regarding the average daily numbers employed at different periods and the cost of the relief-works :—

RELIEF-WORKS under PUBLIC WORKS DEPARTMENT.

| DISTRICT. | Average number employed daily January–May. | Average number employed June–November. | Total expenditure. | Advanced, but no account of expenditure received. |
|---|---|---|---|---|
| | | | Rs. | Rs. |
| Puri - - - | 1,182 | 2,500[6] | 83,177 | — |
| Cuttack - - - | — | 650 | 15,638 | — |
| Balasore - - - | — | 300 | 6,877 | 8,000 |
| Midnapur - - - | — | 650 | 15,308 | 7,400 |
| Burdwan - - | — | 190 | 4,612 | 5,839 |
| Nadiya - - - | — | 800 | 19,726 | 50,000 |
| TOTAL - | 1,182 | 5,090 | 1,45,339 | 71,239 |

[1] O. R. I., 43.

[2] "Puri must get rice from elsewhere. May I authorise advance for this purpose for Puri, Cuttack, or Balasore?"

[3] O. R. I., 48. The Board in their Apologia state that the reference here was only to importations for the food of labourers, not for feeding the whole people; and they further argue that the Commissioner meant only to import from Balasore, not from across the sea. This, however, seems more than doubtful (paragraphs 95–114).

[4] *Ibid.* I., pp. 52, 66, 67.

[5] The Board, however, show (Apologia, paragraphs 125–126) that the Company only imported 125 tons, which only lasted till end of March.

[6] In Puri, 1,182 were employed daily from January to May at a cost of Rs. 25,099 or Rs. 5,020 a month, or about Rs. 4 each. I have estimated the numbers employed from June to November from the expenditure on this datum.

Besides this, about 1,260 were employed in Puri for the first five months of the year on works specially opened in Government estates.

12. *The management of the works.*—There were complaints on the part of the officials that the famine-stricken people would not come to the works, and that those who did come would not do a fair amount of work. The former statement was true of some classes. The collector of Balasore wrote as follows[1] regarding them :—

" The class of men by whom the dacoities have been chiefly committed are " Pans " and " Kandras," who hold but little, if any, land of their own, and eke out their support by working for the better class of ryots. Owing to the scanty crops, these men obtained but little employment at the last harvest, and consequently did not receive the payment in paddy they have been accustomed to earn. Although these people saw no hope of finding sustenance in their own villages, they will not go elsewhere to seek employment. During my tour in the cold season, I strongly urged them to go to the Irrigation Company or to Calcutta for work, assuring them they would be able to get employment at remunerative wages. The only reply I received was—let the irrigation works commence near our villages, and we will readily work in cutting the canals, but we will not leave our homes. Our ancestors never went from their villages to seek work, and we will not. They consider it a disgrace to work as coolies, and it is a common saying of the women—" Let our sons die rather than become coolies." They call themselves muzoors, " *i.e.*, labourers." I asked many of the zemindars and other landowners at Sorab, especially those to the west of the Juggernath Road (in August), why more coolies did not come and take labour on Public Works. Their continual answer was, of the men who remain most prefer to die at home, and the few who could be tempted to take unusual employment would run away to Calcutta when they had a few pice. They have not houses near the road, and know it is death to live in the rain."

But beside the original unwillingness to come to work, there was a further reason for their staying away in the unsuitability of the arrangements made for their employment. The errors of these arrangements are summed up in two phrases: the petty contract system, and the piece-work system. In Balasore there were no special relief-works, and the ordinary public works, to which the people were in vain invited to come, were carried on in the usual manner.[2]

[1] " That mode is to work by a system of petty contracts wholly unfitted for relief in times of famine. The contractors make their profit, and under them the work is carried on by gangs, who do hard task-work. Neither under the contractors, nor when working direct under the Government officers, is it possible to measure the work of each individual labourer. He or she must belong to a gang who work in common. Their common work is measured and the money is divided. Hence an individual wishing to earn a livelihood must first obtain admission to a gang, the gang will not admit a labourer who from weakness is unable to do a full day's labour, and, above all, they will not or cannot admit more than a certain proportion of women and children, since these ordinarily do not dig, but only carry. Throughout these events by far the greater number of the applicants for relief have been women and children. Many of the able-bodied men went away to seek more profitable labour in less famine-stricken districts, leaving their wives and families behind them. For people so situated the ordinary form of public works is of little avail. Mr. Windle, the Executive Engineer of Balasore, distinctly tells us that the ordinary task rates allowed did not suffice to provide a sufficiency of food when rice became very dear, and the people emaciated. His work was not in the station, but at a distance where it is admitted that it was very difficult to procure rice. It is evident that for the relief of famine, works must be very specially arranged. And our opinion is that, obstinate and prejudiced as in some respects the Ooryahs are, those of them who are accustomed to labour have not, as has been sometimes supposed, shown, as a rule, an extraordinary determination to refuse work when it has been offered to them under favourable conditions, though many have starved without seeking work at a distance, and some unaccustomed to labour may have starved rather than accept labour close at hand."

In Puri and Cuttack, the officials of the Public Works Department, though apparently aware of the danger of the piece-work system, adopted it, in despair of inducing by any other method the famine labourers to perform a fair amount of work. On this the Famine Commissioners pronounce as follows[3] :—

In case of moderate scarcity, which affects only the habitual workers for wages, increased public works in the ordinary form may do good, but it is most amply shown by experience that the moment there is anything approaching to general famine, the moment, in fact, that serious want is at all wide-spread, public works, conducted in the ordinary manner by contract at ordinary task rates, are quite inappropriate and unavailing. In every case, there should, we think, always be a special and entirely distinct arrangement for famine works, under which the wages, whether in the form of daily or of task-work payments, the provision of food, and the whole of the system, should be adapted to the employment of large masses of people to whom such labour is *not* habitual. Especially things should be so arranged that every individual who applies, and especially every woman, should have immediate employment without reference to any gang system which may render them dependent on the will of others, excepting so far as they voluntarily accept such an arrangement. We think that such works should never be placed under the same Executive Officers who at the same time superintend other works conducted in the ordinary manner. Special works should be superintended by special officers, who must fully understand that they must divest themselves of preconceived notions and must adopt an entirely different standard of professional duty."

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[1] O. R. I., pp. 76–77. [2] O. R. I., p. 77. [3] O. R. I., 173 (Part 3).

They sum up their views on the labour question in the following pregnant sentences, which are too important to be omitted here[1]:—

"The conduct of the measures required in famine seems in all parts of the world to involve a constant nice-steering between Scylla and Charybdis, of a character many times repeated. If special relief-works are commenced too early, the ordinary labour market is disturbed without necessity; if too late, this most legitimate of all modes of relief becomes, as we have said, nearly useless. If daily pay be too freely given, the people of all countries when employed for charity will struggle to do next to nothing. If task-work is rigidly enforced, without the means of making it practicable to all, the object of relief may be defeated. If task rates are too hard, they are injurious; if easy in the extreme, it is probably impossible to vary such rates according to the capacity of individuals, and the stronger labourers are enabled to earn far too easy gains, from which it is difficult to wean them."

The fact was, however, that no steering at all was attempted; the ship drifted into the whirlpool.

[2] "In the districts west of Calcutta they (the relief-works) were wholly ineffectual to prevent extreme famine. It was before the districts had lapsed into extreme and general famine that such works might have been carried out in a way at once useful to the State and beneficial to the people. In all those districts it may be said that both the state of the people and the nature of the seasons required that anything effectual that was to be done in that way should be done before the 1st June. We must pronounce that up to that time nothing effectual had been done. Works were not attempted on a sufficiently large scale; those that were attempted were not conducted on a footing calculated to relieve the famine-stricken; and, above all, food was not supplied."

13. *Gratuitous relief.*—Relief committees were started and local subscriptions began to be collected in December 1865, and it has been already mentioned that in Puri cooked food was distributed to the destitute until the Commissioner (5th February) prohibited the system; the result of which was that the charity of the local committee was confined for a time to giving money allowances to a few (425) distressed families. On this the Commission remark[3]—"Nothing is more clear than this, that though on the one hand "many will not resort to relief centres for cooked food till the last extremity, on the "other, the misery among the very poorest is never properly known till the offer of "food brings out from their hiding-places the poorest and most miserable objects." But at that time, to have opened many feeding-houses and attracted crowds of starvelings when the supply of food itself was so scanty and uncertain, would have been in the highest degree dangerous and unwise. When rice began to be imported, the feeding centres were rapidly multiplied. No rules were laid down as to the uniform management of these places, and there seems to have been a general want of system about them. No test of admission could be prescribed except extreme emaciation; "for those not so bad "the attempt was generally made to provide some kind of labour, real or nominal, and "food was given in return for labour. But when rice was short at the more distant "centres, those who seemed tolerably able-bodied were turned out of these gangs, "and told to go elsewhere,"[4] though there was hardly anywhere else for them to go to. The condition of residence was not prescribed, and at first there was a great lack of shelter for those who lived at a distance from the centres; and when huts were built they showed much disinclination to reside in them, and "those who did reside there "lived in a manner that must have been demoralising and debasing in the extreme."[5] No scale was laid down as to the proper ration required in such cases, and there seem to have been great varieties in the quantities of food served out to each person.[6] There was much caste prejudice; "many were deterred by it from seeking food till it was too "late, and some died without seeking it at all."[7] But the Commissioners held that too much prominence was given to this last objection. That it was not caste prejudice that was the main cause of mortality is evident from the fact that it is stated on all hands "that[8] by far the greatest loss of life has fallen on those lower castes who had least

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[1] Ibid. p. 176.

[2] O. R. I., 126.

[3] O. R. I., 49. See also p. 107.

"In May, Mr. Herschel went to meet the Commissioner of Orissa at Mohurbhunj on business not relating to the famine. In passing through his own district, his attention was not attracted by excessive distress, but in Mohurbhunj he was a witness to acute famine, heard what had come to pass in Orissa, and saw Mr. Ravenshaw feeding the starving. This excited his apprehensions as to the eventual result in his own district, and on his return he stopped at a place in the Jungle Mehals, and offered food to the starving. The result was to bring the famine-stricken and emaciated in numbers from their hiding-places, and Mr. Herschel at once became aware of a state of things which he had not known before, and ascertained that there was already mortality directly resulting from starvation. On his return from Midnapur he immediately organised relief operations under a local committee."

[4] O. R. I., 97.

[5] "Opinions seem to have varied between 4 and 8 chittacks, that is between ½ lb. and 1 lb. of rice for an adult, and the Board of Revenue appears to have favoured the scale of ¾ lb.

[6] Ibid I., p. 177

[7] Ibid. I., p. 97.

[8] Ibid I., p. 98.

"caste prejudice, whose manner of life least unfitted them to avail themselves of public "relief, and who were most accustomed to labour."

14. *Numbers relieved and cost.*—The following statement shows, as far as returns exist, the average daily number of persons relieved in this manner from June to November, and the cost of the relief:—

| District. | June. | July. | August. | Sept. | October. | Nov. | Dec. | Daily Average for 6 Months. | Amount expended. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Grain. | Cash. |
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. |
| | | | | | | | | | Maunds. | Rs. |
| Puri | — | 2,844 | 6,599 | 9,012 | 10,846 | 10,485 | — | 6,631 | 16,626 | 99,660 |
| Cuttack | 1,301 | 4,789 | 14,090 | 27,886 | 34,704 | 34,581 | — | 19,559 | 52,565 | 280,774 |
| Balasore | 5,875 | 14,890 | 19,231 | 38,163 | 36,838 | 19,252 | 10,308 | 24,093 | 46,816 | 232,920 |
| Midnapur | 5,155 | 7,442 | 9,606 | 8,752 | 6,476 | 4,274 | — | 6,949 | 14,800 | 100,697 |
| Manbhum | 322 | 1,262 | 2,831 | 5,825 | 9,630 | 4,253 | 1,925 | 4,341 | 1,000 | 81,360 |
| Total | 12,653 | 31,227 | 52,357 | 89,638 | 98,494 | 72,845 | 12,263 | 61,573 | 131,307 | 795,411 |
| Bankura | No return | 5,000 | 5,175 | 8,223 | 14,818 | Operations gradually closed. | | 5,536 | — | 32,446 |
| Singhbhum | 324 | 649 | 649 | 649 | — | — | — | 379 | — | — |
| Bardwan | — | 845 | 1,490 | 327 | 90 | 158 | — | 485 | — | 8,005 |
| Hugli | — | 645 | 3,242 | 5,700 | 6,000 | 4,900 | — | 3,414 | — | 37,470 |
| Howra | — | — | — | 1,041 | 1,041 | 1,041 | 1,041 | 694 | — | 22,090 |
| Nadiya | 2,799 | 7,580 | 7,620 | 535 | Operations gradually closed. | | | 3,089 | — | 34,988 |
| 24-Perganas | — | 264 | 1,162 | 3,156 | 8,862 | 9,492 | — | 3,823 | — | 56,624 |
| Total | 3,123 | 14,983 | 19,338 | 19,631 | 30,811 | 15,591 | 1,041 | 17,420 | — | 191,623 |
| Grand Total | 15,776 | 46,210 | 71,695 | 109,269 | 129,305 | 88,436 | 13,274 | 78,993 | — | 987,034 |

For columns 1–8, see O. R., II. 637. For column 10, see I., p. 101, column 6 of table; for column 11, see II. 640.

Making allowance for the imperfection of the returns, it appears that about 80,000 people were relieved daily for six months continuously; and if the proportions were the same elsewhere as in Orissa,[1] about 30 per cent. of these performed some light labour in return for the food, and the rest were too weak to do any labour at all. The cost of this relief is not easy to calculate. In the first five districts of the list, the paupers seem to have been fed mainly, if not entirely, with imported rice; and of this they received about 90 seers each, or 15 seers a month, or 1 lb. a day. But it is not clear how the cash relief was given, or to whom. Some no doubt was expended in buying rice locally, some in house-to-house money doles as in Puri, some in huts, establishment, &c. In the other districts entered in the lower portion of the list, the money was probably spent in local purchases of rice for the most part; the cost falls at about Rs. 11 per head or almost Rs. 2 a month, for which price in most of these districts about 15 seers could be purchased.

15. *Quantities and cost of rice imported.*—The amount of rice imported[2] into the Province of Orissa up to the end of November was 271,577 maunds; of this, 253,146 maunds had been used in the following manner:—

| | Maunds. |
|---|---|
| Distributed as food | 116,007 |
| Sold to the public | 79,253 |
| Do. at cheap rates | 49,103 |
| Sold to Government Departments | 8,783 |

But before the end of December 1866, 398,047 maunds[3] had been sent to Orissa, and 413,347 maunds altogether, including despatches by land to Midnapur and Manbhum; of this, 89,275 maunds remained in hand at the end of the year, and 324,072 were used; but details of the distribution are not given, corresponding to those quoted above. It has been assumed, however, in the preceding paragraph, that all the grain sent subsequently was sold, and no more was distributed as food after the end of November. If so, the quantity sold was 208,065 maunds. The 413,347 maunds (or 14,770 tons) imported cost, including all expenses of carriage, Rs. 21,25,861 or Rs. 5·2 per maund. The quantity sold brought in Rs. 5,62,075, and if this is the price of the 208,065 maunds mentioned above, the average selling price was Rs. 2·11 per maund, but no doubt a good deal should be deducted for losses by loose packing, pilfering, &c., and this would

[1] *Ibid.* I., 101. [2] O. R. I., 100, 101. [3] O. R. II., 638.

enhance the price received for the quantity actually sold. The value of what remained in hand was calculated at Rs. 3–4 per maund, but the price it actually fetched is not recorded. The principles on which the sales were conducted are thus stated by the Commission[1]:—

"Wherever rice could be spared from the charitable distributions of food, it was sold; and the difficulties and disadvantages of the gratuitous distributions were so great, the famine was so much more one of food than of money, that it may be almost said that the rice sold did more real good than that distributed. The system was to sell at two rates, one at or near market rates (so far as there were market rates), and the other cheaper; the former sales being conducted by Government officers, the latter limited to selected persons intermediate between the very poor and those better off, to whom tickets were to be given by the members of the Relief Committees. This last system, however, though it sounds well in theory, seems practically to have everywhere for the most part failed. The committees were very unwilling to exercise an invidious discrimination, the privilege was sometimes given to classes (old women, boys, &c.) which led to imposition, and altogether there was much confusion and abuse, and sometimes terrible crowding and struggling. There seems to have been almost no limit to the quantity of rice which might have been sold at very high prices, if it had been available."

Of the effects of these importations the commission says :—

"The rice imported was scarcely enough to feed a twentieth part of the population, on full rations, for six months. If by supplying a certain quantity to a larger number and supplementing their means one-tenth of the population was saved (being about, as we said before, a life for every maund imported), a great work was done; though unhappily the number saved would be still much smaller than that of those who died."

The financial result of these importations may be summed up thus—

| | Rs. |
|---|---|
| Cost of rice imported (4,13,347 mds.) - - - | 21,25,861 |
| Deduct receipts from sales - - - - - | 5,62,075 |
| Estimated value of stock in hand - - - - | 2,90,144 |
| Total - - - - | 8,52,219 |
| Balance or net cost to Government - - | 12,73,642 |

16. *Arguments for and against importation.*—Of all the questions raised during the administration of relief measures in the course of this famine, the most important one was, whether it was or was not the duty of Government to import food into Orissa. So far as the arguments used on either side are of permanent weight and interest, it is necessary to recapitulate them; so far as they were based on ignorance of the extent of the calamity and on inaccurate information as to local prices they may be omitted. The opposition of the Board of Revenue rested mainly on the sound theory that if there was scarcity prices would rise, and that high prices would either bring to light hidden stores, if they existed, or else would attract grain from other parts, and that if private trade did not import grain it was useless for Government to think of doing so.[2] Now as to the existence of local stocks, the opinions of officers on the spot varied. The Commissioner firmly and constantly asserted his belief in them; and the town populace strongly held that the dealers were keeping back stocks in order to enhance the price. But the district officers persistently declared that no large stocks existed, and the irrigation company showed their opinion by importing rice for the use of their own labourers. No doubt, say the Commission in their report,[3] there must have been a considerable quantity of grain in the country, or else in the absence of extensive importation almost every one must have died, and the fields have remained unsown; but there were not purchasable stores available in the market for those who wanted grain. The small hoards kept by individual cultivators for their own consumption could not be tempted out by high

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[1] *Ibid.* I., pp. 96–97.

[2] In their report of 9th November they wrote—"The Government has command neither of the funds nor "the agency which would be necessary for undertaking this gigantic enterprise. If it be true that the laws "of supply and demand work here so slowly that while they are getting into operation lives are sacrificed, it is "the very reason why nothing should be done to interfere with them, for, be their operation sluggish or active, "they are the sole real dependence of the country." See also Mr. R. B. Chapman's Memo., dated 3rd November 1865. O. R. H., p. 534. "The second question is, whether we can safely depend upon the natural laws of "demand and supply for the distribution of food to those districts where there is scarcity. I fear that we "shall not find the action of these laws as prompt in this country as they are among the more energetic and "vigorous races of the world; and that before the flow of grain sets in to the districts where it is most needed "there may be a great deal of suffering. Nevertheless, I feel confident that so far from this being a reason "why the Government should overlook these laws, or run counter to them, it is only a reason for additional "caution in doing anything that can possibly discourage the natural current. It is quite certain that, if the "great natural law does not act efficiently, any spasmodic attempt on the part of the Government to supply "its place will not succeed. Efficient or not, we *must* rely upon this law alone, and whatever is done should "be done carefully, with a view to encourage, and to avoid discouraging, the natural working of the law."

[3] O. R. I., p. 59.

prices, and there were no large stocks in the hands of traders. Next, as to high prices attracting grain from a distance, the peculiarity of the country[1] had to be considered; it possessed no body of enterprising traders, and hardly any means of communication. The one road from Calcutta viâ Midnapur was unbridged, and the coast is a dangerous and difficult one, with no port, no ships, and no appliances for landing cargoes. And in effect it became manifest, as soon as prices rose to famine pitch in Orissa, that they did not have the expected effect, and that no quantities of grain worth speaking of were being carried into Orissa. Lastly, there remained the argument, that if trade did not undertake the task, any spasmodic attempt on the part of Government to take its place would not succeed. The grounds for this opinion were not stated. What was meant probably was not that the thing could not be done, but that it could not be done without enormous and undue expense; and that it could not be done so effectively as to supply all the wants of a great population. In a forcible memorandum written by Mr. Chapman (7th March 1867) in which he still maintained, in spite of the event, that the Board of Revenue had been in the right, he urges[2] that "as a matter of fact, if the Government "had imported into Orissa at all during the early months of the year, it must have done "so at immense loss,.....it must have been prepared to pay a much larger price for "foreign and inferior rice than that for which it could apparently buy the native rice on "the spot."

"In conclusion, I venture to assert, even now, that when famine occurs, unless within very narrow limits, it is beyond the power of Government to overcome it. Immense resources have been brought to bear upon the relief of Orissa since the commencement of June with a minimum of results. Principles, after all, though they may be sneered at, and even broadly denied, cannot be overcome. The State cannot successfully convert itself into a wholesale dealer in grain, and any attempt that it may make to do so is almost sure to end in wide-spread disappointment and failure.

"Nor is this the only evil result of such interference, for the State cannot interfere in such matters only to supplement private operations. It must be prepared, necessarily, to substitute its own machinery entirely for them; at what a cost, and with what tremendous risks, I need hardly point out."

To this the commission reply that the proper course would have been, on the 29th January, not to peremptorily refuse to import rice, but to order inquiries to be made into the allegation that rice could not be bought for the relief-works; if this had been done, the delusion of the price currents would have been dispelled, and it would have been recognised that it was the duty of Government, in some way or other, to make provision for feeding those whom it offered to relieve.[3]

"If only as an employer of labour in Orissa, we think that Government would have been justified in taking the most effectual means of paying that labour in the shape most effective for the object in view; and if so much had been done in February, we believe, as we have said, that the matter would not have stopped there; the ice being as it were broken, many and great necessities would have been pressed with irresistible force, and much might have been done in the months which elapsed before the setting in of the violent monsoon in June."

In fact, this doctrine has now become so universally recognised that in the famine of 1877 every officer in Bombay, Madras, and Mysore understood that he was bound to see that food stocks were sufficient for the needs of his gratuitous relief and the labourers on relief-works; and if there was any danger of their running short, to purchase from the nearest market that could sell. It has been frequently seen that if this principle is carefully explained and strictly adhered to, the purchase of grain by government for its own paupers will not deter the trade from importing grain for sale to the public. As to Mr. Chapman's assertion that the State's efforts must end in disappointment and failure, it is not easy to understand its meaning. If there is any soundness in the Commissioner's view that every maund of grain imported saved a life, it can hardly be said that the very moderate exertions that were made had a minimum of results. Concerning the general

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[1] The Board of Revenue (Apologia, paragraphs 30, 33, 35–8) maintain that the isolation of Orissa and the deficiency of traders have been much exaggerated. "The Orissa report itself contains ample evidence of the "existence of petty traders active enough, and the accounts of the operations of the current year, now periodi- "cally published, testify to the same thing.....In regard to Bengal generally, it is surely absurd to deny the "perennial activity of the grain dealers. Grain dealing is one of the standing occupations of the country.... "The Board have little doubt that the grain trade is even more active in Bengal than to the westward." They quote also statistics which show that Balasore has a considerable export trade to ports along the coast. To this the Government of India replied, that the event had proved the real isolation of that province, and it was a marvel that the Board should even now consider the statements of the Famine Commissioners to be exaggerated, or that, with the advantage of local knowledge, they should not have found this out for themselves.

[2] O. R. II., p. 533.

[3] O. R. I., p. 62.

question of when Government should import grain, the following extracts show the final conclusions of the Commission :[1]—

". . . The simple rule seems to be that which we have already quoted, viz., that Government should import only when, the want existing, from special circumstances no one else is likely to do so, or the merchants cannot do so to a sufficient extent. Those special circumstances must generally be either physical obstacles, or an extraordinary want of efficient traders. . . . . It is now difficult to suppose the case in which it would be the duty of Government to import from Bengal ; but the time may come when all energies, public and private, will be overtaxed. In Upper India such a case is still more improbable ; private enterprise there has hitherto only been limited by the means of transport ; and as Government could not suddenly increase those means, its interference in trade could only do harm. Its duty is rather by every possible means to increase the means of transport of which use may be made on an emergency.

"In case it should again be necessary for Government to import food into our province, our opinion is, that experience shows that it is better that it should be sold to the public at market rates only, and that no attempt should be made to sell at different rates to different people according to the degree of their ability . . . . To the starving, food must of course be given gratuitously, and for the public labourers it must be provided in such a way as best suits the circumstances of each case."

17. *Apologia of the Board of Revenue.*—The letter of the Board of Revenue (15th August 1867) in which they reply to the censure passed on them by the Famine Commission and the Government, contains some valuable remarks both on this subject and as regards the general causes of failure to appreciate the signs of coming distress. The Board—

(para. 21) "admit unreservedly that, in their opinion, the measures adopted for the relief of the sufferers from the famine in Orissa and some other places have been shown, by the event, to have been insufficient, and that nothing but the importation of food by the Government, and that at a very early date, would have enabled the local officers to grapple, in any degree, successfully with the famine."

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(Para. 196.)—"The Board account for the delay which occurred in regard to the adoption of effectual measures to meet the famine thus—

"(*a*). From the want of experience of famine by the people themselves, their presentiments of famine were far less distinct, and the outward indications of its approach were far less definite and less early, than they would have been in countries habituated to famine.

"(*b*). At the same time, the same want of experience on the part of the administration, local and central, prevented them from realizing the full significance of the phenomena that did present themselves, as officers accustomed to famine might have done.

"(*c*). Neither of these causes would have produced very serious results, but for this that all the remedies, heretofore found sufficient for the mitigation of famine in India, were very largely ineffectual in this case. Money was of little use, for it could not be exchanged for food.

"(*d*). Neither would even this circumstance have materially paralyzed the power of the Government but for this, that, to be at all largely effectual, it was necessary that the discovery of the full truth should be made, and very extensive measures adopted, many months before the actual outburst of unmistakeable famine occurred."

(Para. 197.)—"In the Board's opinion, no fair comparison can be made between the action of the administration last year and that of other administrations on former occasions, unless these two vital distinctions of the conditions precedent be fully and honestly recognised and disposed of. They, in fact, constituted the essential distinction, and, as it has proved, the insurmountable difficulty to the authorities in Bengal in the famine of 1865–66."

(Para. 198.)—"The Board are well aware that, even apart from the light of the event, it is not possible to look back upon proceedings taken in any important conjuncture without being aware of many things that might have been done better. As regards themselves, for instance, they frankly admit and regret that they did not, even without the orders of the Government, institute in December a closer enquiry into the outturn generally of the harvest. They believe now that such an enquiry might possibly have led to a timely discovery of the full extent of the coming evil, and of the appropriate remedy. They regret that they did not grant remissions of revenue in December 1865. They regret further that, owing to its isolated and therefore unintelligible character, they did not comprehend the important significance of Mr. Ravenshaw's telegram of the 31st January, which, if followed up, might again possibly have proved the means of discovering what was hidden from the authorities."

18. *Treatment of emigrants.*—Mention has already been made of the crowds that collected in towns in which relief was distributed, and especially in Calcutta, where the numbers were estimated[2] at from 15,000 to 18,000 in June or July.

"Nothing could exceed the munificence of the rich native gentlemen of the town in feeding these poor people, but the very extent of this munificence being noised abroad tended to increase the evil; no discrimination was exercised between the deserving and undeserving beggars; little or no shelter was provided, and the people so liberally fed lay about the town in a wretched and mendicant condition."

In August,[3] the evils of this system were so strongly felt that the distributors of private charity were prevailed upon to stop their doles of food: a paupers' camp was

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[1] O. R. I, p. 175. [2] O. R. I, p. 114. [3] O. R. I, p. 114.

formed outside the town, into which the immigrants were compelled to go, and they were gradually sent back to their homes. Altogether 11,515[1] were deported in this way, but many, no doubt, returned, and were sent back again and again. A party of emigrants from Balasore were sent back by sea,[2] and landed there while famine was still at its height. Other deportations were effected with more care and thoughtfulness, especially in the case of weavers from Jahanabad and other places in the Hughli District,[3] for whose reception and employment local arrangements were made before they relegated. It does not seem that the Calcutta authorities made any attempt to employ these immigrants on relief-works in the neighbourhood of the town.

19. *Reliance on local charity and on the zemindars.*—Two other points remain to be mentioned on which the Commission expressed views that it is useful to record here: they are—the reliance that Government should place on local charity administered by the agency of local committees; and on the liberality of the landholders. As to the first[4]—

"Experience has very amply proved that, although this may suffice to meet small, or even in some cases considerable, local distress, it is a resource wholly inadequate to meet anything approaching to severe or general famine. Where the circumstances are favourable, and rich and liberal residents are to be found within the district, as at Murshidabad, local distress of a somewhat severe character may be met, as it was met in that district. But the examples of Nadiya and Midnapur conclusively show that, in the best ordinary districts, the efficient relief of famine, or of very general distress affecting considerable portions of such districts, cannot be approached by the means to be obtained from this source. Where general and excessive distress spreads over such districts, the resources of local charity are completely overtaxed and paralysed."

As to the second point, it is said[5] that though the—

"theory is that in return for the benefits conferred on them by Government, the zemindars are to be in patriarchal fashion the fathers of their people,"

yet the practice of 80 years is opposed to this.

"'No obligations enforced by legal process compel them to support the poor of their estates in time of famine, and they do not recognise any sufficient moral obligation to do so."

They are generally of two classes, the old and resident people who are too poor to help, or the rich absentees who have merely bought land as an investment of money.

"It is much to be regretted that the feeling that the landholders ought to support the poor has in any degree deterred the Government from giving liberal aid, for the result is that the poor have starved.

"[6] We would draw particular attention to the unvarying and decided character of all the evidence taken by us regarding the zemindars of Orissa. It cannot be said that there are two opinions on the fact that the great body of the zemindars have lamentably failed in the duties expected of them. We have described the evil which has resulted, in the past year, from a reliance on them for duties which are theirs in theory, but which the practice of generations has shown that they ignore in fact. And we think it necessary to recur to the subject here, because it appears that this theory of the Bengal Administration is still, to a great degree, made the basis of measures for the future. In the previous letters regarding the settlement, the Board of Revenue recommended fixity of the revenue, to the exclusion of remissions for bad seasons, on the ground that the profits of good years would ena le the zemindars to give the ryots the necessary remissions in bad years, as if they thought that the zemindars, being under no legal obligation, would really do so. And in the very letter (No. 5002B., dated 20th November 1866, to the Government of Bengal) with which they submit the report showing the failure of the zemindars in the past year, they say "whatever capital may still be in the hands of the wealthier zemindars will be severely taxed to meet the calls of their tenants for assistance during the coming year," apparently still imagining the zemindars to be benevolent and enlightened landlords ready to share with their tenantry the last shilling of their capital. We observe, too, from the published reports, that it seems to be proposed in the most distressed tracts to make advances not to the ryots but to the zemindars for the benefit of the ryots. It is impossible to subordinate facts to a theory."

20. *Cost of the Famine in* 1866.—In conclusion, the cost of the famine up to the end of 1866, as recorded in the Report of the Famine Commission, may be summed up approximately as follows:—

| —— | Cost to Government. | Cost to the public. | Total. | Average Number relieved. | Period of Relief. |
|---|---|---|---|---|---|
| | Rs. | Rs. | Rs. | | |
| Gratuitous relief in cash - - | 5,53,669 | 4,69,601 | 10,23,270 | 80,000 | 6 months. |
| Ditto. do. by importation of food | 12,73,642 | — | 12,73,642 | | |
| Relief works - - - | 2,16,579 | — | 2,16,579 | 3,310 | 11 „ |
| Works on Government estates - - | 33,404 | — | 33,404 | 1,260 | 5 „ |
| Total - - - | 20,77,294 | 4,69,601 | 25,46,895 | | |

[1] *Ibid.* I, p. 117. [2] *Ibid.* I, p. 75. [3] *Ibid.* I, p. 113.
[4] O. R. I, pp. 124–125. [5] O. R. I, p. 125. [6] O. R. I, p. 141.

## Part II. 1867.

21. *Famine Commission's forecast for* 1867.—Sir G. Campbell and the Famine Commission believed that the worst distress was over when they paid their visit to Orissa.[1] They wrote on April the 6th, 1867:—"In November the new crops began to come "into the market in considerable quantity, and then the general famine may be said to "have come to an end. The people returned to their avocations, leaving only the very "emaciated, the orphans and widows." And again, on April 16th[2]—

"In the districts where the distress has been partial, we trust that with good crops things are rapidly returning to their normal condition, and it is only in respect of the country where the injury has been greatest that the question of remedial measures is very pressing. This description principally applies to Orissa.

"It seemed to us that the relief which continued while we were in Orissa was confined to classes of helpless sufferers by the previous events, whose condition gave them the strongest claim on public charity.

"Great as must be the desire of all to afford the largest amount of succour to the poverty and distress to which attention has been so powerfully drawn, we think that, looking to the condition of society in India, and to the burden already borne by the Government in this country, it is not desirable that any feeling of regret for the delay which unhappily occurred in providing sufficient measures of relief in the past year should lead to any such excess of liberality in the present season as might tend to diminish a due reliance of the people upon themselves, or hastily to abrogate that wonderful social poor-law which, in the absence of any system recognised by positive law and administered by the State, induces the people of this country voluntarily to support their own poor to an astonishing extent.

"Leaving aside for the present the parts of Orissa most devastated by the floods, and also the emaciated and helpless persons thrown on the care of the public when the general famine ceased, our hope is that, in the greater part of the country, that which is now wanted for recovery is rather that measures should be taken for facilitating its progress than direct aid on a large scale.

"With regard to the physical condition of the people, we have said that those who had not passed an extreme point of exhaustion seem to have rapidly recovered. Severe diseases of the bowels generally end soon in death or cure, and to the somewhat singular infrequency of the excessive fever which has been remarkable in other famines and which so long hangs about the constitution, we may probably attribute the rapid recovery of the people of Orissa. The last accounts which we have seen appear to encourage the hope that in reality little disease of a severe and wide-spread character has been left behind among the general population.

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"We hope that, in the present year, good crops and good prices may have already done much to restore the former class, the more so as the revenue demand has been remitted on condition of remission of rents; and as respects those whom we have described as the proper labouring classes, and even the artizans, it may be supposed that so soon as agricultural and general prosperity return, the sad diminution of their numbers will, in a considerable degree, improve the condition of the remainder. Already the demand for labour exceeds the supply, and the irrigation company were importing labourers from a distance when we were in Cuttack.

"Our hope, then, is that, special localities excepted, little direct aid will be required for any other than the helpless persons already alluded to, or at least that a moderate expenditure in providing labour near their own homes for some of those who are not likely to seek it elsewhere, and only till the agricultural season has fairly set in, will suffice."

22. *Results worse than was expected.*—This view of the recuperative power of the Province proved however to be too sanguine. In December 1866 Mr. Schalch (member of the Board of Revenue) was deputed to make special inquiries into the condition of the people. He reported that while the crop, in the tracts where there was any crop, was exceptionally good, in the parts which the inundations had visited there was absolutely nothing saved; and these parts he estimated at half of Cuttack (the central part lying along the Mahanadi), the southern third of Puri, and the south-eastern part of Balasor, with a population of about 850,000; he calculated that the area in which the crops were saved, aided by stocks and what small private trade existed, would supply food to half of this population, but that the rest must depend on Government importations; and he reckoned that at five maunds per head, to feed them for nine months, the necessary quantity to be imported was 1,210,000 maunds. The cost of this would be Rs. 4 per maund when imported and stored; but it could be sold at Rs. 3-4 a maund, and the loss to Government, including establishment, &c., would be about Re. 1 per maund, or 12 lakhs of rupees on 12 lakhs of maunds. This recommendation was approved by the Bengal Government, on the ground that "the holders of grain, taught "by the experience of the past year, will be unwilling to part with it until the safety of "the next crop is assured, while the internal trade of the Province is slow to adapt "itself to new channels, and it is now certain that no dependence is to be placed on "supplies by private merchants from abroad."

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[1] O. R. I, p. 96.

[2] *Ibid.*, pp. 135–6.

In January the number of applicants for relief began largely to increase, deaths from starvation were reported in great numbers (about 40 a day in the Cuttack District), prices showed a tendency to rise, and reports came in from the district officers giving a melancholy picture of the desolation and distress of the country. On the 12th February a public meeting was held in Calcutta, at which the Viceroy made known what had been recently learnt as to the circumstances of the people, and invited the public to bear its part in the duty of relieving the famine-stricken. An influential committee was appointed, and the sum of Rs. 6,14,503[1] was subscribed. The following principles were laid down as to division of labour:—[2]

The Government took upon itself the expense and responsibility—

1*st*—Of importing by sea all the rice required for relief.

2*nd*—Of storing such rice in the first instance in order to its distribution.

3*rd*—Of providing all the rice required in lieu of pay in the Public Works Department.

4*th*—Of making all tuccavee, seed-grain advances required by zemindars for sowing and other purposes, or for the purpose of local improvements to estates.

5*th*—Of meeting at its store-depôts all requirements for rice from the public, and from the Famine Relief Committee, at certain fixed prices.

6*th*—Of providing, in concert with the East India Irrigation Company, public works sufficient to meet all demands for labour.

7*th*—Of providing a special staff to superintend the operations of the Famine Relief Committee.

The Famine Relief Committee took upon itself the expense and responsibility—

1*st*—Of collecting and distributing public subscriptions.

2*nd*—Of the carriage of rice from the Government depôts into the interior of the country.

3*rd*—Of providing sub-depôts, shops, and other means for the sale and distribution of rice in the interior of the country.

4*th*—Of administering relief to the public generally by every process except those left in the hands of Government.

The transactions on the part of Government were carried on by Mr. Schalch, the Junior Member of the Board of Revenue; and, for the purpose of these transactions, Mr. Schalch had under him the Commissioner of the Province and a staff of officers entirely independent of the Committee, whose sole duty, so far as their connection with the Committee was concerned, was to import, store, and distribute rice into and out of the Governmont depôts in Orissa.

All other relief transactions were carried on by the Committee on behalf of the community; and they acted in concert with certain local committees and had under them a staff of officers entirely independent of the Government, whose sole duty it was to carry on, under orders direct from the Committee, all relief transactions other than those conducted by the Government.

These officers were a Special Commissioner (Mr. Molony) and three young civilians, each having charge of the measures in one district, and under them one or two deputy collectors, a civil surgeon, and four subordinate medical men. The nature of the system carried out by these officers in 1867 leaned, as was natural, to the opposite extreme from the parsimony of 1866; for the calamity had been so great, and the horror provoked by it so profound, that it was not unnatural that the moving principle should be a compassionate desire to relieve distress at all costs, rather than a careful regard for economy in the administration of the public finances.

23. *Importation of Rice.*—These operations were placed entirely in the hands of the Board of Revenue. At first it was intended to import 4,00,000 maunds; this quantity was then raised to 6,00,000, and afterwards to 8,00,000, and ultimately by the end of the year 10,55,825 maunds were imported, which, added to the stock in hand on 1st January 1868, 60,985 maunds, made a total for consumption of 11,16,810 maunds. At the close of the year 1867, the stock in hand was 6,17,642 maunds, so that the quantity actually sold or distributed (including waste and shrinkage) amounted to 4,99,168 maunds. Of this, 1,30,865[3] maunds were sold to the public and to Government Departments (*i.e.*, the Jail and Commissariat at Cuttack) and the balance given to the Famine Relief Committee. The rice was bought partly from Calcutta and partly in Burma; and the selling price was fixed at first at Rs. 3-4 per maund for Calcutta and Rs. 2-12 for Burma rice; afterwards, when distress grew severe, before the ripening of the Beali or autumn crops, it was lowered to Rs. 2-8 and Rs. 1-12 or Rs. 2 per maund, and after the winter crop came in it had to be sold at a great sacrifice. The Beali or autumn crop was unusually large and good, and in October 1867 the Board reported that the condition of the people and prospect of the country had so

[1] R. C. p. CCIII.

[2] R. C. p. VIII.

[3] G. p. 307. The balance made over to the Committee is here stated as 3,93,839 maunds, which cannot be made to agree with the amount consumed as stated below in the text. The Board debit themselves (page 306) with Rs. 5,70,313 on account of sale of grain. If this is the price of the 1,30,865 maunds, they got a very high price for it, Rs. 4–6 per maund.

much improved that importation of grain should cease and the embargo on export[1] should be taken off from the beginning of 1868. The local paddy was then selling at about 50 seers per rupee, and it was so much preferred by the people that they could not be induced to buy the imported rice, and the Government sales had almost entirely stopped. The cost of the purchase and importation of this 10,55,825 maunds seems to have been Rs. 47,86,201,[2] or Rs. 4-9 per maund.

24. *Distribution of rice by the Relief Committee.*—The following statement shows the manner in which the rice made over to the Relief Committee was disposed of by them :[3]—

| | Maunds. |
|---|---|
| Sold to the public - - - - - | 1,59,430 |
| Used as food at poor-houses - - - | 78,035 |
| Distributed in village relief - - - - | 54,293 |
| ,, as wages to spinners and weavers - | 25.263 |
| Wages on light labour - - - - | 1,418 |
| Loss - - - - - - | 21,052 |
| Total - - | 3,39,491 |

25. *Sales of rice to the public.*—The Relief Committee had the task of conveying the rice from the depôts or golahs in which it was stored by the Government to their own places of sale and distribution, which were generally near the Government golahs, and were scattered all over the country. Out of the 3,39,491 maunds which they received they sold 1,59,430[4] maunds to the public. The cost of this grain to Government (at Rs. 4-9 per maund) was Rs. 7,27,400: the value at which it was charged to the Committee was Rs. 4,38,431 (or Rs. 2-12 per maund—from which it would seem it was all Burma rice), and it was sold by the Committee for Rs. 3,35,111, or Rs. 2-2 per maund. This, however, is inclusive of some sales at cheapened rates up to April 1868. No rates appear to have been absolutely fixed; the object was to relieve distress, but to interfere as little as possible with private trade: and in the end it was found best "to "discover what the applicants for relief could afford to give, and at what prices they could purchase elsewhere, and to regulate the depôt rates accordingly."[5] The maximum quantity to be sold to each person was fixed at three seers: but, as it was found that this was evaded, and that the necessity of coming long distances for so small a quantity was a hardship, the maximum was raised to six seers. The rest of the rice was expended in gratuitous distribution at the relief centres and in village relief.

26. *Relief houses.*—The earliest subject that attracted the attention of the relief officers was the very unsatisfactory condition of the poor-houses or relief centres at which cooked food was distributed, but residence and discipline were not enforced. The views of the Famine Commissioners on the validity of the objections felt to this mode of relief have already been quoted (paragraph 13); but it seems clear that the prejudice felt by the people was extremely violent, that it was shared by the local officers, and was, to some extent at least, justified by the results. Before the beginning of the operations under the new system Mr. Webster, Assistant Collector at Cuttack, had reported that the test of cooked food was too severe.[6]

"The present system of giving cooked food to people who collect at a fixed place can only reach those who are reduced to the verge of actual starvation, as, until this point is reached, no Ooryah would on any consideration submit to the degradation which he considers is entailed by resorting to Unnochutters. When once this point is reached, the chances of recovery are very slight indeed."

When the new Relief Committee took charge of the work, they found about 43,000 people congregated at these relief centres. These persons had mostly belonged at first to the pauper class, but there were also many who had been in more respectable positions, and who, having been forced by famine to apply for food at these places, had lost their caste and been rejected by their relations, and had become altogether demoralised.[7]

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[1] No proclamation appears to have been issued by Government forbidding export, but the Government of Bengal (4th February 1867) instructed the Commissioner to "let it be generally known that the Government will not allow rice to be exported by sea from those parts of Orissa which are now being supplied with food at the cost of the State: a prohibition to this effect should be issued by the Commissioner."

[2] See para. 41, items 3 and 7. [3] R. C. p. 23.

[4] Or by another statement (p. 26) 135,569 maunds, which they sold for Rs. 3,22,016, or Rs. 2-3 per maund. But all the accounts are full of contradictions.

[5] R. C. p. XVIII. [6] R. C. p. II. [7] G. p. 145.

"The women became prostitutes, the able-bodied men would not work, the clothing delivered them was stolen or sold. In one centre (at a latter period of operations) some 9,000 or 10,000 persons, at another some 3,000 persons, were found receiving food in idleness, and yet capable of more or less labour. At another centre no less than upwards of 500 Brahmins were discovered in the receipt of full rations, yet doing nothing. At another centre persons drafted, as capable of work, into the light labour gangs, were found reducing themselves again to that state of physical weakness at which it became necessary again to receive them into the centres. On another occasion, when the light labour system was introduced in Cuttack, persons were found leaving the centres there, and demanding admittance at the centres in Puri, where the light labour system had not then been introduced. On another occasion, persons drafted from the centres into the light labour gangs steadily refused to work, and collected in a body at the centre whence they had been discharged, demanding their usual rations, and threatening to force their way in, and take them."

Efforts were made at once, but cautiously, to weed out these crowds: they could not be dispersed immediately, for there were many women with children whose male relations had died or deserted them, and most of the residents were ill-clad and emaciated, and suffering from cutaneous diseases, helpless and infirm, and not fit to be moved. But the able-bodied were drafted out to work, organisation and order were introduced, and suitable in-door occupations provided for the resident paupers. A uniform ration was laid down as follows:[1]—

| | | |
|---|---|---|
| Adult per diem, in 2 meals, | rice | 13 chittacks. |
| | Dâl (pulse) | 1 chittack. |
| | Oil and salt | $\frac{1}{3}$ „ |
| Child per diem, in 2 meals, | rice | 8 chittacks. |
| | Dâl (pulse) | $\frac{5}{7}$ chittack. |

The following table shows the progress that was made in reducing the numbers[2]:—

| | Cuttack. | Puri. | Balasore. | Number fed daily. |
|---|---|---|---|---|
| March - - - | 31,962 | 7,780 | 3,907 | 43,649 |
| April - - - | 18,222 | 8,780 | 3,566 | 30,568 |
| May - - - | 10,473 | 7,087 | 2,960 | 20,520 |
| June - - - | 9,974 | 5,921 | 1,894 | 17,789 |
| July - - - | 9,141 | 4,452 | 1,354 | 14,947 |
| August - - - | 8,416 | 3,083 | 843 | 12,342 |
| September - - - | 5,840 | 1,938 | 421 | 8,199 |
| October - - - | 3,958 | 926 | 149 | 5,033 |
| November - - | 2,199 | 160 | 57 | 2,416 |
| December - - - | 714 | 82 | 17 | 813 |
| January - - | 151 | — | — | 151 |
| February - - - | 40 | — | — | 40 |
| March - - - | 35 | — | — | 35 |
| Total - - - - | | | | 156,502 |
| Average number fed daily for 10 months - - - | | | | 15,650 |

The cost of this relief was Rs. 3,83,827,[3] or Rs. 2-7-9 per head per mensem. Of this Rs. 2,24,835 is the estimated cost of the rice used (78,035 maunds). The rest is due to establishment (Rs. 45,051), buildings (Rs. 14,487), transport of grain (Rs. 14,233), and the balance is made of contingencies including hospital charges for medicines and extra food. Calculating the rice at its full cost to Government, Rs. 4-9 per maund, the actual expenditure was Rs. 5,29,659, or Rs. 3-6 per head.

27. *Unpopularity of the system of relief by distribution of cooked food.*—The opinions of the officers engaged in the relief administration were extremely hostile to this mode of support. Mr. Kirkwood, relief manager in Cuttack, expresses these feelings very forcibly:[4]

Para. 87.—"That the distribution should take the shape of cooked food is another objection, since it is a mode of relief which consciously degrades the recipients. It certainly acts as a check in preventing many from applying for relief; but, while some of those kept away may be no proper objects, I believe the greater portion would be those whose caste prejudice and not uncommendable pride would rather meet death than degradation.

Para. 51.—[5] "The objections that may be urged against relief-houses are: (1) the demoralization that inevitably ensues from crowds of both sexes being huddled together; (2) the unhealthy tendency

[1] G. p. 150. [2] G. p. 313*a*. [3] G. p. 146.
[4] G. p. 147. [5] Ibid., pp. 150–51.

there always must be in crowds of such a nature to depression of spirits owing to surrounding sights and offensive smells; and (3) the feeling of degradation that must, wherever degradation is possible, accompany such an accustomed way of living. The second objection is touched on by Colonel Smith in his Part II, paragraph 6, as "that mournful prostration so common among the helpless paupers of the "relief-houses." The objection I have to cooked food, even when cooked by Brahmins, is, that relief in such a form is not acceptable to many deserving of it, and that, in all other cases than where the system of large relief-houses is adopted, it is practically inconvenient. Indeed, such a method of distribution lays down that it is the duty of the relieving officer to relieve only the actually starving, or to compel a relinquishment of prejudice, rather than that it is their duty to find out the deserving objects and administer relief to them in the most acceptable way at their disposal. I need hardly say that where such ideas are entertained efficient administration of relief is impracticable."

To those who maintain that State relief ought never to be made attractive, and that the condition of the pauper receiving such relief ought never to be on an equality with that of the self-supporting labourer, it will appear probable that Mr. Kirkwood's objections to these institutions were partly due to his sense of their unpopularity.

Indeed, throughout his report, the necessity of establishing any test to keep off unworthy applicants, and the fear lest relief should be administered to those who are not in real need, are only mentioned to be rejected; and he insists strongly that the prejudices of caste are so deeply ingrained that it is no use struggling with them, since the people will perish of starvation rather than save their lives by abandoning them:[1]

"Better rather the indiscriminate relief which during the late famine was administered by some of the native gentlemen in Calcutta, than the dread of imposition which would lead a well-intentioned official to restrict relief within certain narrow limits in order to satisfy himself that none who do not deserve participate."

At the same time it is fair to say, that the other two relief managers do not seem to have entertained views as hostile as Mr. Kirkwood's to these institutions. Mr. Rampini (Balasore) writes:[2]

Para. 12.—"The principles on which I have endeavoured to regulate the distribution of this kind of relief have been (1) that the recipient should be incapable of manual labour, either from age, debility, or disease; and (2) that the recipient reside within the relief-house premises. I believe that, without insisting on these two rules, this species of relief will degenerate into an abuse, while that by a strict observance of them it may become the best and most efficient means of relieving actual famine. Some exception may, perhaps, be taken to the second rule, but experience soon shows that it is necessary to enable the officers in charge of the relief-house to carry out the provisions of the first rule, and to exercise due economy in the preparation of the meal; and, moreover, the little restraint imposed by a compulsory residence within circumscribed limits is found to be a most efficacious means of thinning from the relief-house mere vagrants and beggars and others unworthy of receiving relief.

* * * * * * * * * *

Para. 13.—Much has been said against relief by distribution of cooked food, and there can be no doubt that it is open to the most grave objections. It is costly, it is demoralizing and degrading in its effects, it draws the people away from their homes, and their houses fall into ruins. Still, I would remark, it would seem to be a necessary evil in time of actual and pressing famine. I know of no other means of relief by which the lives of those dying from hunger can be saved. The provision of extended employment, sales of rice at low rates, and distribution of relief in villages of raw rice, are excellent means of averting or staying a coming famine; but I would say, to offer either of those kinds of relief to a starving person is but a bitter mockery, and that, therefore, in time of actual famine the Unnochutters are most necessary institutions."

Mr. Toynbee, relief manager in Puri, has the following remarks on this subject, which tend to show that the charges brought against these relief-houses were due more to their utter mismanagement than to any inherent defects in the system:—

Para 5.—"Before undertaking any new measures of relief, steps were taken to improve the existing ones. Orders were at once issued, and estimates called for, for the provision of superior and enlarged accommodation at all the centres, and for the erection of separate hospitals for the sick and infirm. It was with the greatest difficulty that these measures could be successfully carried out before the breaking of the rains, which every one looked forward to with more or less apprehension . . . . . Establishments were revised, and a fixed and more liberal scale of diet allowed, and precautions against abuses were adopted, such as the preparation of "register of inmates," "order books," "inspection books," &c. The medical arrangements were also placed on a satisfactory footing . . . . The good effect of these measures soon became apparent in the improved health of the paupers, who gradually seemed to lose, though only to a certain extent, that incapacity for, and dislike to, exertion which has been all along so marked and characteristic a result of the system of gratuitous distribution of cooked food. As much as possible was done to provide suitable work. Gardens were established at all centres, and the twisting of coir rope at those in the neighbourhood of which coir was procurable. Those paupers who knew any trade, such as basket making, &c., were put to it; and whenever Public Works Department or Ferry Fund work was available in the neighbourhood, the able-bodied were turned adrift with a few days' rations, while the weaker were put to light labour. Where there was

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[1] Para. 47.

[2] R. C., p. 161.

unfortunately no work of any kind, the paupers passed the greatest part of their time in searching for snails, ság, or any other eatable rubbish which they could pick up. The inmates of the centres were composed of old or infirm men, and of women and children, with or without parents or friends. By far the larger proportion were women, unfortunate widows whom, in the struggle for existence in 1866, their relatives have been compelled to turn adrift to shift for themselves.

28. *Loss and recovery of caste.*—When the relief-houses began to be closed in September 1867, great anxiety was felt[1] as to what would become of the outcaste paupers and how they would be treated by their relations and friends on their return to their villages. The learned Brahmins of Puri, Cuttack, and Calcutta were consulted, and gave their verdict that no one ought to be put out of caste for any act committed in order to save life; but that a payment of a few annas and the performance of some simple ceremonies should in any case suffice to restore him to his original position.

29. *Village relief.*—In place of the poor-houses thus discredited, relief was given by distributing raw grain to people at their own homes. The distributors were the special deputy-collectors and inspectors appointed for the purpose; they visited all the parts where suffering was most intense, and drew up lists of persons deserving relief; this was given either in money or clothing, or sale of raw rice at reduced rates, or the gift of a ticket on the nearest depôt, or of rice at the rate of 20 days' supply to last a month.[2]

Mr. Molony writes[3]—

"The original intention of calling for lists from the zemindars was abandoned and the Kanungos were required to prepare lists. These, however, were found of little use, and the lists prepared in the villages by the inspectors were preferred. The proposal to give to those only who were wholly incapacitated for work was also not strictly adhered to, and the plan of proportioning the amount of relief to circumstances of the people was substituted, by which means the women and children of numerous families were partially supported while the crop was being cultivated by the men, who otherwise have been obliged to abandon their homes to seek food at a distance,—a course which would have resulted in the breaking up of the house and family."

"No doubt the system was abused, and there were instances of such abuse in the issue of raw rice, in persons concealing their circumstances in order to receive more relief, in some persons obtaining tickets for relief at two different centres, in Sarbarakars, or headmen of villages, extorting money on pretence of securing relief tickets, in the police extorting money on pretence of tolls from ticket-holders on their way to take relief from the depôts, and so on; but, on the other hand, the distribution of relief in the villages produced many and obvious good effects. It opened out village stocks; it gave confidence generally; it saved many from the terrible death of starvation who were prevented by caste prejudices, or by the honest fear of shame and contamination, or by the unwillingness to break up the family home, from resorting for relief away from home . . . . . and above all, it brought back or retained the labouring population at their proper homes and their usual avocations; and so it tended more than any measure towards restoring the status quo of the province."

Mr. Toynbee reports that in Puri there had always existed a system of distributing raw grain and money to the poor inhabitants in the large villages where relief centres existed, and also in the khas or Government estates. This system was now enlarged. The district was divided into five circles, and three of these, in which distress was more severe, were placed under three deputy-collectors, and the regular system of house-to-house village relief was only undertaken in these circles. In the two other circles two officers gave relief to all those whom they met on their inspection tours who needed it. In the first-mentioned circles, each deputy-collector had three inspectors; these visited every village, gave tickets to those who seemed in need of relief, and informed the recipients of the day and place fixed for them to meet the deputy-collector and receive their rice. The deputy-collectors attended at fixed central stations, visiting on the way a village here and there to test the inspector's work: on the day of distribution, if the ticket-holder appeared a fit object for relief, he received his rice, and with it authority to draw a monthly supply from the depôts: if not apparently in need of help, his ticket was cancelled and further enquiry made. When all the circle had been visited in this way, the deputy-collector took to regular inspection of the relief measures, and cancelled the tickets, month by month, of those who appeared no longer to need help. Altogether they visited 969 villages in nine months and relieved 64,998 persons, the average relief given to each being 12 seers: besides which 4,722 persons got 6 annas ahead in cash.[4]

"The greatest difficulty met with was in the conduct of the people themselves, who left their villages before the arrival there of the inspectors, clamoured round the deputy-collector in crowds, and almost entirely upset all his arrangements for the issue of tickets to certain villages only on certain fixed dates. In addition to this may be mentioned the difficulty of travelling after the first breaking of the rains, and that of procuring provisions at all times, both being aggravated by the character of the people. In Mr. Ellis's circle must be further added the unhealthiness of the climate, which in a medical report on the effects of the famine by the sub-assistant surgeon is characterised as "deadly to

[1] G. p. 173. [2] G. p. 202. [3] R, C. p. 4. [4] R. C. p. 174.

strangers." It is only fair to the officers concerned to state that all these obstructions were successfully overcome. The average quantity of rice given to each person was small; but it must be remembered that the larger portion of those relieved were aged or infirm people and children. In other cases, full subsistence allowance was purposely withheld, in order that the recipients might be compelled to do something for themselves to eke out the supply which they had obtained gratuitously; had they got more they would have been doubtless more contented, though less really benefited. Former inmates of Chutters, however, received a larger quantity, as their circumstances were entirely different."

In Balasore (where distress was less severe) Mr. Rampini did not consider it advisable to adopt this system at all. In Cuttack it was extensively practised, and Mr. Kirkwood considered it most beneficial; and "if the services of distributors, who will laboriously and conscientiously perform the duties entrusted to them, can be secured, it is a mode of relief open to comparatively little fraud." His report, however, contains little information as to the way in which it was carried out, but the general system was the same as described by Mr. Toynbee for Puri. It appears[1] that 5,858 villages were visited, and 137,770 persons received 10 seers of grain apiece, while 8,428 persons received 12½ annas each: but it is not shown how far these were different persons; and many of them must have been counted over and over again on each occasion when they received their monthly dole.

30. *Results of village relief.*—The total number relieved in this way was as follows;—

| Month. | Numbers relieved in | | Total. |
|---|---|---|---|
| | Cuttack. | Puri. | |
| March | — | 2,561 | 2,561 |
| April | — | 3,385 | 3,385 |
| May | 5,245 | 5,314 | 10,559 |
| June | 12,968 | 14,582 | 27,550 |
| July | 22,888 | 7,504 | 30,392 |
| August | 44,857 | 14,225 | 59,082 |
| September | 38,225 | 10,666 | 48,891 |
| October | 15,344 | 5,970 | 21,314 |
| November | 8,420 | 3,550 | 11,970 |
| December | 73 | 1,963 | 2,036 |
| Total | — | — | 217,740 |
| Average of 10 months | — | — | 21,774 |

The cost of this relief is stated[2] as Rs. 1,73,880, which is made up of the value of 53,757 maunds of rice and Rs. 8,442 in cash. This would represent only Re. 0-13-9 per head if the recipients were all different persons who were relieved only once for all; but this can hardly have been the case.

31. *Light labour relief-works.*—Those who were fit to do any active work at all were employed on the light labour relief-works, and it was observed of the paupers who were drafted to them from the relief-houses[3] that "the moment work in any suitable shape and to any forcible degree was given, their physical condition and discipline improved *pari passu;* those who were capable of a full day's labour were excluded from those works and sent to be employed under the Public Works Department or the Irrigation Company:" only those who were fit to do something, but were not fully able-bodied, were received on these works. It was no easy matter to start them or to keep them going.[4]

"In one instance they refused to work in them, and returned clamouring and threatening to the centre whence they had been drafted. In another instance they fled the centres where the system was being introduced, and flocked to other centres where it had not yet been introduced. Then, when they once were drafted into the light labour gangs, it was as well their object as the object of their overseers to keep them there, and thus many able-bodied labourers, whose services would have been available for full day's work to the Public Works Department or the East India Irrigation Company, were kept in comparative idleness and uselessness, and at higher rates on the light labour gangs; as for instance, on one occasion, at Bonomalipore, where in one day no less than 350 persons were found in the light labour gangs capable of doing a full day's work. And again on another occasion, when in the breaking up of a light labour gang no less than 3,000 persons were said to have sought employment on the Government embankment.

[1] R. C. page 220. [2] R. C. p. XIV. [3] R. C. p. XIV. [4] *Ibid.*

"The system as a whole worked well; many persons in the centres were obviously and for a long period quite unfit for a full day's work. It was better, morally and physically, to give them light work rather than no work at all. As they became capable of light work, they were drafted out of centres, and the centres were to this extent temporarily, and at last permanently, thinned. In the light labour gangs they to some extent paid their own way, resumed their former habits of industry, and gradually regained health and strength. When capable of a full day's work, notice to quit was given: and they either disappeared of their own accord, or were drafted into regular labour, and so became merged once again naturally into the population."

32. *Adoption of the piece-work system and its results.*—The system on which they were employed was one of piece-work, but with the rates fixed so low, that it was impossible for any one, however infirm, not to earn a livelihood. "The relief committee "contracted to do the work at so much per hundred cubic feet, but the workmen did "not do a full day's work, and yet were paid rather more than the ordinary full day's "pay either in money or rice." Mr. Kirkwood, who was the author of the system, thus describes it:—[1]

"We have in the Cuttack district succeeded singularly well in the working of our light labour system, and have, with one or two unimportant exceptions, always given specific rates of payment. When a person in a very weakly state joins a gang, he has generally been given food or money sufficient to enable him to support himself for a few days. During this interval he does some work, little it may be, and earns something; this saving helps him to eke out the earnings of the next week. During the fortnight thus got through, he has probably gained sufficient strength to enable him to subsist on our rate without any extraneous aid. The rates were so as to be capable of sustaining the weakest; the weakest have invariably improved after a short time, and any other class than the weakest have been able to earn sufficient, in proportion to their strength, to subsist well, to buy clothing, and even to save." * * * * "No matter what form gratuitous relief takes, it has in all but the worse cases somewhat of an enervating effect, or rather has not the tendency to raise the spirits and increase strength that manual work of some nature so emphatically has. The very effect of work does a wonderful amount of good. I think I may safely say that it has been found that when once a person gets into a light labour gang improvement begins; when into a reli - house (as often as not) deterioration."

The original orders, dated March 2nd, fixed the rate at 2 pice per ten cubic feet, or 5 annas per hundred cubic feet: and it was reckoned that a party consisting of a man, woman, and a child would do 75 cubic feet and earn $3\frac{3}{4}$ annas, of which $2\frac{1}{4}$ annas would be enough to feed them, and they would save $1\frac{1}{2}$ annas.[2] But very soon the rate was raised to 1 pice for 4 cubic feet, or $6\frac{1}{4}$ annas per hundred: and in July to 1 pice for 3 feet or $8\frac{1}{4}$ annas per hundred cubic feet. Mr. Kirkwood actually apologises for not raising it higher:[3]

"Any higher rate would only meet with increased laziness on the part of the workers. and, as experience has shown, a diminished outturn of work. The rate of 1 pice per 4 feet was a very suitable one, with rice selling at 12 seers per rupee."

"The work was of the nature of excavating canals, constructing embankments, roads, and such like. Allowing half a seer of rice to be sufficient to support a woman, we find that, with rice selling at 12 seers, if she could earn a daily wage of 3 pice she could subsist. To earn this at the rate of Rs. 3-13-6 she would have to do 12 cubic feet of earthwork. The weakest may in some cases have been unable to complete more than this; but the average work of the women employed was much nearer 20 feet, and this gave room for the purchase of salt and other necessaries. Subsequently the price of rice fell to 16 seers and 20 seers per rupee, and more than mere subsistence became not only possible (it was possible before) but probable. I do not take into calculation the increased rate we gave during the rains, as that was merely a set-off against the days on which work was impossible and idleness compulsory."

The idea thus being that the wage should be so fixed that a weak labourer might be able to save part of it, it was not thought an objection that a moderately strong labourer who could dig 100 cubic feet in a day would receive six annas, or six times as much as was needed to support him. The system, liberal as it was, does not seem to have been effectual in stimulating the energies of the labourers, for an outturn of 20 cubic feet per diem would not be thought large[4] on any relief-work where the daily wage system exists, except in a time of temporary disorganization.

In Balasore the attempt to enforce piece-work was less successful—[5]

"The people were at first found so utterly disorganised and unaccustomed to restraint that it was impossible to introduce a strict task-work system. The system of daily payments at the rate of

[1] G. pp. 91 and 92. [2] R. C. p. XCII. [3] *Ibid.* p. 124.

[4] In the North-Western Provinces, in the famine of 1877–78 (when earthwork was exceptionally hard), it was laid down that 1,000 cubic feet ought to cost Re. 1-6-6, if executed by able-bodied famine labourers, but that for the specially inefficient gangs double or treble this rate might be allowed. Six men, six women, and six children were to dig and carry 1,000 cubic feet, or on an average 55·5 cubic feet each: the inefficients might do half, or in an extreme case a third of this quantity. Thus it appears that a larger tale of work was got by the daily-wage task-work system in the North-Western Provinces than by the piece-work system in Orissa.

[5] *Ibid.*, p. 165.

1½ annas for men, 1¼ for women, and 1 anna or ¾ anna for children, was retained for some time. Latterly, as a more efficient establishment was obtained, and as the paupers became more accustomed to labour and discipline, payment by task work was introduced, but as the gangs were weekly replenished by draftings from the centres, there was always a considerable number from whom only a very nominal work could be expected."

Mr. Toynbee's account of the system in Puri is still less encouraging—[1]

Para. 10.—"The light labour system has not been, on the whole, a success in the Puri District, owing chiefly to the want of works of greater extent. In March there were about 1,500 people engaged in cutting drains through the sand on the daily labour system, but this relief was in reality gratuitous, as they did little or no work, and no return was obtained for what they did. It was undertaken for want of something better, and for the purpose of keeping the people from strolling about the town begging, after being denied admission to the chutters."

33. *Numbers employed and cost.*—The numbers employed on these light labour works were very few in Balasore and Puri—in Cuttack their maximum was 9,178 in May. The following table shows the monthly numbers :[2]—

| —— | Cuttack. | Puri. | Balasore. | Total. |
|---|---|---|---|---|
| March - - - | 2,145 | — | 2,331 | 4,476 |
| April - - - | 7,304 | 372 | 1,571 | 9,247 |
| May - - - | 9,178 | 372 | 1,455 | 11,005 |
| June - - - | 8,382 | 190 | 639 | 9,211 |
| July - - - - | 6,301 | 664 | 661 | 7,626 |
| August - - - | 5,099 | 611 | 863 | 6,573 |
| September - - - | 3,067 | 603 | 855 | 4,525 |
| October - - - | 1,886 | 596 | 700 | 3,182 |
| November - - - | 881 | 256 | 205 | 1,342 |
| December - - - | — | 208 | 264 | 472 |
| January - - - | — | — | 290 | 290 |
| Total - - | — | — | — | 57,949 |
| Average of 10 months - | — | — | — | 5,795 |

The total cost of these works was Rs. 1,45,216[3], or Rs. 2-8 a head, for which sum, with rice at 12 seers per rupee, 30 seers, or a seer a day, could be bought; a more than ample provision for men, women, and children taken together. The value of the works done, estimated at Public Works Department ordinary rates,[4] was Rs. 71,928, or nearly 50 per cent. of the cost.

34. *Ordinary labour relief.*—A large quantity of employment was also afforded to able-bodied labourers by the Irrigation Company, who were then pushing on their works, and by the Public Works Department, as well as by the importation and transport operations. The reports contain no information of the nature of the work, nor is it clear whether they were ordinary works paid for at the usual rates, or relief-works carried out on a special system. There is, however, a casual allusion to shew that the Irrigation Company were induced by Government to raise their rates in order to attract labour, and probably they were recompensed for this; the Public Works Department works too must have been much more extensive than are usually carried on in Orissa. The following table gives all the information that is to be obtained regarding this expenditure :[5]—

| Works. | Outlay in 1867. |
|---|---|
| | Rs. |
| Irrigation Company - - - - - | 6,07,400 |
| Public Works Department - - - - - | 8,42,348 |
| Local Funds - - - - - - | 87,394 |
| Total - - - - - | 15,37,142 |

If we include the Rs. 72,645 paid by Government for light labour, we may safely reckon, excluding the outlay of the Irrigation Company, that Government expended 10 lakhs of rupees on wages of labour, besides a contribution given to the Irrigation Company, the amount of which is not known.

[1] *Ibid.*, p. 176. [2] G., p. 313*a*. [3] *Ibid.*, p. 89.

[4] These rates, however, are extremely high, 4 annas per 100 cubic feet, and probably include other items besides the actual payments to coolies.

[5] R. C., p. 29.

35. *Relief given by spinning and weaving.*—A very extensive amount of relief was also given to the respectable classes in spinning and to weavers in weaving. In Puri, cotton was given out and paid for when returned as thread at the rate of 12 annas a seer: thread was given to weavers, and they received 4 to 6 pice, or 12 chittacks of rice, for each yard of coarse cloth. In Cuttack, too, this system was successfully worked, and Mr. Kirkwood's set of rules[1] will be useful to any one in a similar position. The thread and cloth spun and woven in this way were sold to realise a considerable portion of the outlay: the gross cost was Rs. 216,261,[2] and the receipts from sale were Rs. 1,25,023, leaving a net expenditure of Rs. 91,138. For this sum a total number of 68,773, or an average number of 6,877, persons were supported for 10 months, costing Re. 1-9-3 per head monthly.

36. *Orphans.*—The number of orphaned or deserted children was extremely large: altogether 18,146 passed through the hands of the Committee, but the great majority of these died deserted, or were reclaimed by their relatives. At the end of December 1867,[3] there were 1,487 orphans in the hands of guardians selected by the Relief Committee. After considerable discussion it was decided that if any parents or other fit guardians of the children came forward to claim them, they should receive charge of them: but in default of these the committees were to make the best arrangements they could, and generally this ended in their being taken care of in Missionary orphanages. The Government undertook to grant Rs. 3 a month for the maintenance of the children till they came to the age of 16 for girls, 17 for boys, receiving in return the balance in the hand of the Relief Committee, which amounted to nearly the sum which these payments were calculated to cost, Rs. 2,50,000. A passage in Mr. Kirkwood's report shews not obscurely the misery from which these children were rescued by their reception into orphanages—

Para. 61.—"The mortality among the orphans has been very great. In many cases they arrived with constitutions frightfully shattered by the starvation and exposure they had undergone, and died shortly after they reached the orphanage. The health of the orphans has, however, considerably improved during the late cold weather. There are now about 800 orphans—300 boys and 500 girls—at the missionaries' orphanages; these are the residue of a number nearly double; the others have died, run away, or been reclaimed. But even the number of 2,000 cannot represent one tithe of those whom the famine has robbed of their natural protectors. Doubtless many have sought and found refuge among relatives; but the fact that there are known to be some 200 female orphans in the town of Cuttack, who are being trained in the homes of prostitutes for a career of immorality, points with some clearness to the fate of a by no means inconsiderable number."

On this Mr. Molony writes[4]—

Para. 27.—. . . . "But it is to be remembered that Cuttack, with the exception of perhaps Balasore, is the only town of considerable importance in the Province, and cannot, therefore, be taken as an index of the extent of such adoptions. I do not think the circumstances of the districts in 1867 were such as to warrant a presumption that selling or giving children for the purposes of prostitution was largely prevalent. The attention of the Government was drawn to the circumstance alluded to by Mr. Kirkwood by a prosecution (unsuccessful) against a woman of the town for keeping two children received during the height of the famine, and a proposal was submitted to redeem some of the younger children, about thirty-five in number, by paying compensation for their support, and handing them over to the missionaries, who were willing to receive them; but it was considered undesirable to interfere with the children of a more mature age, above eight or nine years, as their presence in the orphanages would be obviously undesirable. The matter is still under the consideration of Government. Any funds the Committee might pay in compensation for the rescue of these children would be well laid out."

37. *Miscellaneous relief.*—These are the principal forms which the administration of relief took. There were, however, some minor measures which deserve to be recorded. Attempts were made to provide for the settlement of the homeless paupers in new localities.[5]

Para. 21.—"In Puri it was at one time proposed to give a bonus to zemindars for every bonâ fide pauper they would take from the centres and settle comfortably on their lands, but this scheme never met my approval. It was likely to prove very expensive, and afforded no sufficient guarantee that the settlers would not return. The sum proposed was Rs. 10 per head; only 50 people were thus settled, and they, I believe, did not return to the centres. Another scheme was tried in the Government estate of Khoordah, in which the Commissioner took a great interest, viz., the formation of a new pauper village. Everything was prepared for the people, a crop put into ground, and houses built for them, and they received rations until harvest time. I believe the experiment, though manifestly a most profitable one for the settlers, has not completely satisfied them, and has been very expensive to the estate."

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[1] G., pp. 122–6. [2] G., p. 119. [3] R. C., p. XX.
[4] R. C., p. 6. [5] *Ibid.*, p. 5.

Money also was given for thatching and repairing ruined houses, and in 36 villages Rs. 3,000 were given to buy seed-grain;[1] "but here again the Committee could not be sure that the relief accorded had actually been given, or had been without filtration." No attempt seems to have been made to help agriculturists by giving them bullocks, or artizans by the gift of the implements of their trade and a little capital to start with.

38. *Receipts and Expenditure of Relief Committee.*—The accounts of the Relief Committee were never made quite clear, but the nearest approach to an accurate statement of these is the following:[2]—

| Receipts. | Rs. | Expenditure. | Rs. |
|---|---|---|---|
| Balance of former relief fund | 27,530 | Establishment and buildings | 1,44,859 |
| | 5,542 | Poor-houses and transport of grain | 1,17,032 |
| Subscriptions in 1867 | 6,14,503 | Light labour | 1,36,106 |
| Sale of rice | 3,34,669 | Spinning and weaving | 1,52,742 |
| Sale of thread and cloth | 1,23,324 | House-to-house relief | 8,443 |
| Sales and miscellaneous articles | 38,234 | Orphanages | 73,088 |
| Received from Government as value of light labour | 72,645 | Miscellaneous | 13,518 |
| | | Unaccounted for[3] | 94,874 |
| | | Transferred to Government in payment for rice and for prospective charges of orphans | 4,60,785 |
| | 12,16,447 | | 12,16,447 |

39. *Remissions of revenue.*—The policy pursued this year as to remission of revenue was very different from what had been considered suitable in the preceding year. The entire demand due in November was remitted throughout the Province, and in all cases where the December crop had been less than half an average one, the zemindars were excused payment of the rest of the revenue demand of the year (due in April). In this way Rs. 15,84,391 were remitted.[4] There was further a considerable loss of revenue from salt and excise, due to the poverty of the people. Taking into consideration the normal regular increase which would have occurred, the Accountant General estimated the loss thus[5]:—

| —— | 1865–66. | 1866–67. | Total. |
|---|---|---|---|
| | Rs. | Rs. | Rs. |
| Loss in excise | 3,00,000 | 9,00,000 | 12,00,000 |
| Do. salt | 20,00,000 | 5,00,000 | 25,00,000 |
| Do. land revenue | — | 15,84,391 | 15,84,391 |
| Total | 23,00,000 | 29,84,391 | 52,84,391 |

40. *Disposal of the surplus stock.*—When the Relief Committee closed their operations on the 1st April 1868, it was necessary to decide how to dispose of the stock of rice in hand, which, according to the latest accounts, stood at 6,17,642 maunds. Some of this was stored at the landing places in "import golahs," some inland at "sale golahs." The Board and the Local Government agreed that it would be unwise to sell it all; a considerable quantity should be kept in hand, as a precaution to meet any unforeseen contingencies, and to keep down the exactions and unjust demands of monopolist traders; and it was at first decided to retain 5,00,000 maunds massed in the central and seaside golahs, and to sell off the balance in the scattered inland golahs. The Commissioner, however, represented that if any such necessity should arise as was anticipated, it was at the up-country golahs that grain would be needed: and moreover he showed that there was no local demand for consumption as the supply of home-grown rice was abundant, that no large traders existed in the country who would buy the

[1] R. C., p. XXII.
[2] Compiled from G., pp. 308, 309, 311, and 312.
[3] It is perhaps to this item that Sir G. Campbell referred in Mr. Bernard's letter of December 11, 1873. "In the Orissa famine, for want of some such arrangements," as a special Audit and Account Department, "over a lakh of rupees on one account alone had to be written off as unexplained or irrecoverable."
[4] This figure is taken from the Bengal Government's reply (Mr. Toynbee) to the Famine Commission, p. 51.
[5] G., p. 304.

Government rice there to carry it down to the sea and export, and therefore they had better sell the stocks collected in the most accessible parts, *i.e.*, in the "import golahs." He further stated that the attempts to sell at Re. 1-8-0 for Calcutta, and Re. 1 for Burmah, rice had been unsuccessful, and he proposed to sell at Re. 1 and Re. 0-12-0 per maund, respectively, but to be allowed discretion to reduce the rates still lower. This was granted, but it took the whole of 1868 and 1869 to dispose of the rice on these terms, and all this time it was rapidly deteriorating and expensive establishments were kept up to look after it. At the end of 1869 the balance in hand was still 81,049 maunds, and it was sold by auction for what it would fetch. The sum obtained from this rice appears to have been Rs. 4,37,625; so that the value obtained was about eleven annas a maund. The grain cost Government Rs. 4-9-0 a maund.

41. *Board's attempt to clear up its account of the expenditure.*—The entire accounts of the expenditure and receipts of this famine appear to be in such a state of hopeless confusion that it is impossible at the present time to arrive at any absolute certainty about them. The Board of Revenue, the Government of Bengal, the Public Works Department, the Relief Committee, and the Treasury Department all kept up independent and discrepant sets of accounts, and no attempts were made to lay down any system of recording and auditing them in such a way as to bring them to a single head or to reconcile them with each other. In May 1868 the Board of Revenue sent up the following statement of expenditure:—

In 1866.

| | Maunds. | Cost. |
|---|---|---|
| | | Rs. |
| Grain imported | 4,02,449 | 20,54,339 |
| Cash relief | | 5,17,141 |
| Total expenditure | | 25,71,480 |
| Received— | | |
| Sale of grain to public | 95,635 | 4,02,892 |
| To Relief Committee | 2,12,502 | 4,40,267 |
| Stock in hand | 64,066 | 2,08,274 |
| Total | | 10,51,373 |
| Net Expenditure, 1866 | | 15,20,107 |

In 1867.

| | Cost. |
|---|---|
| | Rs. |
| Drawn from Treasury | 47,22,781 |
| Received from sales | 5,70,313 |
| Miscellaneous | 30,136 |
| Total receipts | 53,23,296 |
| Expended— | 46,57,172 |
| Balance in hand on 31st December 1867 | 6,66,124 |

These accounts, however, differed so widely from those of the Accountant General's Department, that the Government of Bengal (October 1868) desired that a further attempt should be made to adjust them. This was done, and the attempt went on till December 1872 without much success. The Board showed that in 1866 they received Rs. 6,17,805 as the proceeds of the North-Western Provinces Famine Fund, and Rs. 20,00,000 from Government for purchase of rice. They spent Rs. 19,99,928 on the rice imported in that year, and remitted Rs. 3,75,411 to the Orissa Relief Committees in cash. So far their accounts and those of the Accountant General agreed. In 1867, however, they could not be reconciled. The Board's statement of expenditure is as follows:—

| | | Rs. |
|---|---|---|
| 1866. | Importation of rice | 19,99,928 |
| | Gratuitous relief | 3,75,411 |
| 1867. | Importation of rice | 45,44,848 |
| | Gratuitous relief | 48,000 |
| 1868. | Rice.—Establishments, &c. | 1,02,292 |
| 1869. | „ „ | 36,747 |
| | Marine Department's charges for freight and shipping | 2,41,353 |
| | Total | 73,48,579 |

The Accountant General's statement, on the other hand, showed an expenditure of Rs. 81,05,340, or Rs. 7,56,761 in excess. This discrepancy no efforts could reconcile, and the attempt was abandoned. As to the *per contra* receipts no attempt seems even to have been made. The note drawn up in December 1872 gives the following account of the disposal of the rice :

| | Maunds. | Cost. Rs. |
|---|---|---|
| Imported in 1866 - - - - | 3,99,269 | |
| „ 1867 - - - - | 10,55,825 | |
| Total - - - | 14,55,094 | 69,43,640 |
| Sold to Government and the public - - | 8,16,426 | 10,64,439 |
| Made over to Relief Committees - - | 6,06,607 | |
| Wastage and loss - - - - | 32,061 | |
| Total - - - | 14,55,094 | |

But the Accountant General records Rs. 14,68,335 as recovered by sale of grain in 1866 and 1867, which agrees pretty nearly with the sums with which the Board had debited themselves in 1866 and 1867, as has been seen before at the beginning of this paragraph.

To this must be added the sales of 1868, 1869, and 1870, which brought in Rs. 4,37,625 more, making a total of Rs. 18,92,719.

42. *Attempt to sum up the accounts.*—In any case it is clear that the Board's figure is wrong ; but whether we deduct their receipts from their expenditure, or the receipts as stated by the Accountant General from the expenditure as stated by him, the net outlay was over 62 lakhs of rupees. Besides these sums expended by the Board, we have the expenditure on Public Works and on private charity. The accounts may therefore with some probable approach to accuracy be summarised thus—

| | Rs. |
|---|---|
| Expended by the Board of Revenue on rice importations and local purchases of rice - - - - - - | 81,05,340 |
| Deduct sales of rice - - - - - | 18,92,719 |
| Balance net expenditure on rice - - - | 62,12,621 |
| Expenditure on Public Works in 1866 (paragraph 20) - | 2,49,983 |
| „ „ 1867 (paragraph 34) - | 10,00,000 |
| Gratuitous relief. Public subscriptions— | |
| In 1866 (paragraph 20) - - - - | 4,69,600 |
| In 1867 (paragraph 22) - - - - | 6,14,500 |
| North-Western Provinces Famine Fund - - - | 6,17,805 |
| | 71,64,512 |
| Add loss by salt, excise, and remission of revenue (para. 39) | 52,84,391 |
| | 1,44,48,803 |

Out of this sum a surplus of about two lakhs of rupees remained unspent, but it was taken over by the Government to meet the charges for the maintenance of the orphans ; so that more than the whole of this sum was really expended on the relief of the famine, inasmuch as the Government incurred larger charges for the orphanages than the fund it took over ; and also the contribution to the Irrigation Company has not been reckoned in. But taking the figure as it stands, it appears that five rupees a head was spent on the relief of the famine-stricken people of Orissa.

43. *Conclusions as to the famine management of* 1867.—It is a melancholy reflection that while a larger sum of money was spent on this famine than had ever been spent before, it should be associated in history only with the memory of a greater mortality than had ever been recorded. But the cause of this is not hard to find. The measures taken in 1867 were a violent reaction from the policy of 1866 : and no expenditure was thought too large to incur in shutting the stable door, although the steed was irrecoverably lost. The officers who administered the charitable funds were mainly impressed with the necessity of forcing relief upon the people and making it so attractive to them that no one could refuse it : and hence the cost of this relief was abnormally large. Whether in the relief-houses, on light labour, or in the employment given to spinners and weavers, the wages and the food amounted to far more than a bare subsistence allowance, and there can be little doubt that many were tempted by these high rates to accept relief who were not in absolute need. So again no experienced

person can read the account of the village relief system without seeing that the officials were too few and too new to the work, and the time was too short for them to acquire any real knowledge as to the condition of the people who clamoured for relief; they were obliged either to accept all comers, or to be guided by the rudest of all tests, that of outward appearance, in their admissions and rejections. Still, the destruction of property and comfort, and the moral shock to the whole population in the preceding year, had been so terrible that there can seldom have been a country in which the employment of tests to keep off the undeserving was less necessary; and though many who were relieved cannot have been in severe want, they can hardly have been altogether free from want. The main evil of this lavish and somewhat indiscriminate relief became evident in the tone both of the public and the official mind in 1873, when, with a far less serious calamity to the crops, the same determination was shewn to make relief pleasant and acceptable, and the same ruinous system was adopted of paying the pauper at a higher rate of wage or food than could be earned by the independent labourer.

As to the policy of importing grain, it seems to have been mainly a mistake. Mr. Schalch's investigations were, as has been seen, of the most summary and superficial character: his estimates of the area and population of the inundated tracts, and of the extent of the injury done to the crops, were but rough approximations, and his calculation that the crop saved would supply food for only half the population of those tracts was a guess which was proved erroneous by the event. No information seems to have existed as to the extent to which private trade was active, or could have been stimulated to activity. The resolution to import grain seems to have been come to as if that had been the universal practice of all time, a proceeding which required neither defence nor argument; and it is so accepted by the local officers, who assume that it is the only way in which the necessities of their relief measures can be supplied. It is very probable that some measures were inevitable to place supplies ready for the carrying on of charitable and labour relief; but it never seems to have occurred to any one to enquire whether the required quantity could not have been supplied by the process of giving advances to trading firms on the spot rather than by the expensive agency of Government officers. In any case it is clear that the quantity imported was enormously in excess of what was required. The Relief Committee used less than a third of the million maunds imported at so great a cost; of the rest a small quantity only was sold to a necessitous public, and the balance had to be parted with for next to nothing. Of the total sum spent in 1867 on this object, at least two-thirds, or 28 lakhs of rupees, were absolutely thrown away. It is important to bear this lesson in mind, and to remember how certain Government is, when it enters into a transaction of this kind, to enter into it at a tremendous loss; not only because Government officials are unaccustomed to the business of handling, transporting, and dealing with grain, but also because they are sure, if they aim at safety, to overpass the limit, and to err on the side of excess. It cannot be said that no occasion can arise when Government ought to import grain; but the case must be very rare, and the necessity should be fully proved, before it ventures on an undertaking which must be expensive and may be unnecessary.

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## Section II.—Behar and North Bengal.

Compiled from report by Mr. F. R. Cockerell, 15th March 1867 (quoted as "C").

*The famine tract.*—It has been mentioned that, in the autumn of 1865, the fears of the Board of Revenue were as much aroused regarding the condition and prospects of Behar and North Bengal as they were regarding Orissa. Indeed, it was thought that Gya was even worse off than any part of Orissa; and it was to some extent the greatness of the area over which famine was expected, and the expense and administrative impossibility of providing relief for the whole country, that made the Board at first shrink from taking adequate measures for meeting the distress in Orissa. Happily, the anticipations of evil were not altogether realised in Behar; but there were great distress, severe scarcity, and in some parts the undoubted pressure of famine. The tracts that suffered most were the northern portions (adjoining the Nepal Terai) of Champáran, Tirhut, and Bhágalpur. In a secondary degree scarcity and high prices pressed heavily on the remainder of those districts—on Sarun (especially a tract of about 35 miles in

length by 5 to 8 miles in breadth, which was swept by a hailstorm and its whole crops ruined in February 1866), a portion of Shahabad and Gya, where rice is the main crop, and a considerable area of Monghyr and the Santhal country. The following table was compiled by Mr. Cockerell[1] to show the area and estimated population of the famine tract, and a rough estimate has been added for Bhágalpur and Santhalia:—

| District. | Total Area. | Estimated Population. | Population by Census of 1872. | Area of severe Famine. |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Tirhut - - - | 6,114 | 1,856,000 | 4,385,000 | 3,000 |
| Champáran - - | 3,781 | 870,000 | 1,440,000 | 1,700 |
| Sarun - - - | 2,612 | 1,200,000 | 2,064,000 | 700 |
| Shahabad - - - | 4,403 | 1,602,000 | 1,724,000 | 1,204 |
| Gya - - - | 5,689 | 1,367,000 | 1,950,000 | 1,360 |
| Monghyr - - - | 3,592 | 844,000 | 1,813,000 | 1,316 |
| Total - - | 26,191 | 7,739,000 | 13,376,000 | 9,280 |
| Bhágalpur - - | 4,327 | — | 1,826,000 | 1,000 |
| Santhalia - - | 5,488 | — | 1,259,000 | 1,200 |
| Grand total - | 36,006 | — | 16,461,000 | 11,480 |

A comparison between columns 3 and 4 shows what difficulties the local officers had to contend against in making an approximation to the resources and needs of the country: their estimate of the population of their districts was hardly more than half the truth.

2. *Causes which led to the famine.*—The crops of 1863 had been poor in Tirhut, but those of 1864 were extremely bad over all this part of the country. The rainfall was deficient in quantity and closed early, none falling in October; and thus not only the main rice crop suffered, but the rabi area was small. A brisk export was at the same time draining away the stocks of the country; the following statistics are given[2] regarding it:—

| From | To | Period. | Amount in Tons. |
|---|---|---|---|
| Calcutta - - | Bombay - - | May 1864 to April 1865 - | 291,000 |
| Behar and N. Bengal | N.W.P. - - | Jan. 1864 to Dec. 1865 - | 108,000 |
| Calcutta - - | Foreign ports - | May 1864 to April 1865 - | 616,000 |
| „ - - - | „ - | May 1865 to April 1866 - | 309,000 |
| „ - - | „ - | May 1866 to Dec. 1866 - | 109,000 |

The result of this export was that the average price at 13 important markets in Eastern Bengal (not in the famine tracts) rose as follows:—

September 1864, 27 seers per rupee.[3]
„ 1865, 20 „ „
„ 1866, 11 „ „

The outturn is estimated by Mr. Cockerell at from two-thirds to one-third of an average. In 1865 the character of the season was the same[4] as it had been in 1864,—late rain in June, floods in July, and a total cessation of rainfall in September. In Tirhut, the crop "did not exceed in the Northern Parganas a quarter of the outturn of an ordinary year, and in other places showed a considerable deficiency."[5] In the north-eastern and northern parts of Champáran the rice harvest failed entirely (though the early or bhadoi crop had been fair).[6] In Sarun the Collector reported that the rice crop had failed to the extent of two-thirds, and the rabi crops (including a great deal of opium) were entirely destroyed in the tract of the hailstorm of February 1866.[7] In the bad parts of Shahabad the rice crop had failed to the extent of five-eighths to three-fourths of an average outturn in both 1864 and 1865.[8] In the famine tract of Gya the rice crop failed completely in 1864; the rabi of 1865 was very bad, and the rice crop

[1] Paragraph 150. [2] *C*, paragraph 130. [3] Paragraph 131.
[4] No figures showing the rainfall actually gauged are given in the report. [5] Paragraph 9.
[6] Paragraph 32. [7] Paragraphs 51–52. [8] Paragraph 66.

of 1865 failed, but the extent of failure is not stated.[1] In Monghyr "the crop of 1864 failed to a considerable degree"[2]; nothing particular is stated regarding that of 1865. In the northern part of Bhágalpur we read of the "complete failure of the rice crop."[3] These estimates of loss were based on the best local opinions formed at the time, but are no doubt excessive.[4] Subsequent experience and the most careful investigations have shown that a loss of one-third of the crop of a single year is enough to cause great distress, and the loss of one-half amounts to famine. No country has ever been able to withstand the loss of two-thirds of its crop without a degree of suffering similar to that experienced in Orissa; and any such failure for two consecutive years would lead to the almost complete depopulation of the country.

3. *Brief history of the famine.*—The earliest indications of the approaching calamity were given by the rapid rise of prices that occurred when the deficiency of the monsoon was established. The collectors, for the most part, took alarm in October and November 1865, and reported their fears of impending famine and organised local relief committees, following the course laid down in the Board's report of November, which is referred to in the preceding section.[5] In all cases, however, the ripening of the winter rice in December relieved the tightness of the markets and gave employment to the poor: the funds raised locally were small, and were soon exhausted. The winter rains were unusually abundant, and the rabi crop (so important in Behar) was quite a good one except in limited tracts destroyed by hail.[6] From this time there was a period of apparent lethargy on the part of Government officers. The police reported numerous cases of deaths from starvation, and crime of a kind peculiarly connected with hunger became very common: but no notice was taken of these indications of the prevalent suffering. In April prices again rose considerably; and in May the Commissioner of Patna called on his collectors to take measures to relieve distress. On this, relief committees were again appointed in each district in June; subscriptions were collected, and grants made in addition to them by Government; a large number of relief-centres were opened; food was distributed to the helpless and infirm gratuitously, and work offered to those who could do any labour, however small. In July these measures began to be in working order, and in August as many as 37,000 were relieved daily. The rains, however, were timely and abundant, and the early bhadoi harvest almost put an end to the distress: a small number of paupers however remained on the hands of Government till the rice crop was cut, in December.

4. *Prices.*—The following table shows what is recorded as to the prices of rice at the head-quarters of the affected districts. It is not, however, quite clear what kind of rice is referred to.[7]

| —— | Tirhut. | Champáran. | Sarun. | Shahahad. | Gya. | Monghyr. | Bhágalpur. |
|---|---|---|---|---|---|---|---|
| September 1865 - | 14—9 | 15 | 11½ | — | 10 —7 | 15 —12 | 16½ |
| October „ - | 14—9 | 15 | 10 | — | 10 —7 | 11 —10 | 13½ |
| November „ - | 13—9 | 15 | 13 —7¾ | 13½—12 | 15 —9 | 15 —10½ | 11¼ |
| December „ - | 14—9 | 11 | 14½—9 | 13½—12½ | 15 —9½ | 13 —9½ | 11¼ |
| January 1866 - | 15—9 | 12½—12 | 14 —9 | 13¼—12½ | 14 —9 | 13 —10 | 15 |
| February „ - | 14—8 | 10½ | 13½—10 | 14 —12 | 13½—12½ | 11 —8 | 13¼ |
| March „ - | 13—9 | 10½ | 13½—7 | 13¾—12 | 13 —10½ | 10½—8 | 13¼ |
| April „ - | 10—8 | 9½ | 12½—7 | 11¾—9 | 10½—9¾ | 9 —8 | 12 |
| May „ - | 9—7 | 9½ | 11¾—7 | 10½—10 | 10 —8 | 9 —8 | 11½ |
| June „ - | 9—7 | 8½ | 10¼—7 | 10 —8¾ | 9¾—7¼ | 8 —7 | 10 |
| July „ - | 7—6 | 8½ | 10 —6¾ | 10 —9 | 9½—7¾ | 7½—7 | 8¼ |
| August „ - | 7—5 | 6¾ | 10 —7 | 12 —9 | 8 —6¼ | 7½—7 | 8¼ |
| September „ - | 10—17 | 12½ | 12½ | 14 —10½ | 9½—8½ | 7½—7 | 8¾ |
| October „ - | 9—8 | 16½ | 13 | 14¼—14 | 10 —9 | 8¼—7 | 10 |
| November „ - | 14—9 | 18½ | 14 | 15½—18 | 13 —9 | 9 —8½ | 12¼ |

[1] Paragraphs 73 and 76. [2] Paragraph 89. [3] Paragraph 101.

[4] Taking the first six districts alone in the table in paragraph 1, and applying to them the statistics contained in Mr. MacDonnell's book, we find—

| | |
|---|---|
| Population - - - - - | 11,563,000 |
| Annual food consumption - - - - | 2,891,000 tons. |
| Cultivated area - - - - - | 9,117,000 acres. |
| Produce of an average year - - - - | 3,995,000 tons. |

Half the average produce would not feed the population, and if for two years running half the crop were lost, there would be a deficiency of 1,800,000 tons, which must either be supplied by food stocks or importation; or 7 millions of the population must die.

[5] *See* paragraph 4, Orissa. [6] Minute by Sir G. Campbell, dated 25th November 1873, BB.I. 59.

[7] Thus Mr. Cockerell says (paragraph 33) that in October in Champáran the commonest rice sold at 9 seers; the table on pp. 44–5 says 15 seers. In Gya "only 7 seers of rice could be purchased for one rupee, in October" (paragraph 74); the statement shows 10 to 7 seers. Similarly, for Bhágalpur two prices are given 11 in paragraph 102, and 13½ in the tabular statement for October 1865.

The highest price reached was in Tirhut, where rice ranged at 7 to 5 seers per rupee; and at this time it could only be procured with great difficulty, both in the north of Tirhut and of Bhágalpur. The relief committee of the latter place purchased rice at wholesale rates and sent it out for retail sale in local markets; but in no other district was this found necessary, as the import trade was active throughout the period of distress, and Government interference in importation was not called for.[1] One alleviation of the scarcity was the abundance of the mango crop: in Purneah, in spite of the great demand, 100 mangoes sold for one pice.[2]

5. *Mortality.*—Cholera broke out in all the affected districts in August (except Patna and Bhágalpur), and was very fatal: there was the usual difficulty in discriminating between its symptoms and those of famine dysentery. But, independent of this epidemic, the health of the people was very bad: in the few hospitals in which registration was properly kept up, out of 3,440 patients received during the worst months, 1,632 died within eight days of their admission. The police returns of persons who died by starvation or diseases connected with famine were not very accurately made or carefully examined at the time; but the number amounted altogether to 135,000.[3]

6. *Crime.*—There was a singular outburst of crime in the early part of the year 1866, which mostly took the form of arson, villages being set on fire in order to take advantage of the confusion to plunder the grain-pits. In Tirhut[4] in the four months March to June 613 such cases were reported, the average of previous years not having exceeded 200 in the whole year. In Champáran it was calculated that incendiarism had been at work in 90 per cent. of the villages of the entire district.[5]

7. *Classes that suffered.*—The classes that felt the famine most severely were the professional beggars, the helpless and infirm, petty village artizans, agricultural labourers, and, above all, the "Nooniahs," or saltpetre-makers, whose trade had lately been destroyed by the extinction of the manufacture and export of this article. The ryots, as a class, got through the hard times successfully, only dispensing with hired labour.[6] The landowners sustained no material losses: they neither received any remissions from Government nor made any to their lessees. In the Raja of Darbhanga's estate alone was a portion of the rent[7] (6 per cent, of the whole) remitted to the cultivators.

8. *Conduct of landowners.*—On this subject Mr. Cockerell speaks in terms quite as strong as those used by Sir George Campbell in the Orissa Report. "The landholders "generally may be said to have practically ignored their obligations and responsibilities "in this crisis.[8] There was a marked want of co-operation on the part of the native "landholders and wealthier classes with the authorities."[9] And he sums up thus:[10]—

"As a body, they have in a great measure ignored the responsibilities and obligations of their position under the permanent settlement. There have been individual instances of their distributing food indiscriminately and on a very small scale; but there has been no such open-handed liberality as the occasion called for, except in the few cases previously recorded in this report; they took no action for the relief of the general distress, either in the way of applying their own means in combination to that object, or exerting their influence to induce the wealthier portion of the community, with whom their example and persuasions would have had weight, to bear their share of the burden of maintaining the starving people. Nor can they be said to have responded readily to the appeal of the Government officers to their sympathy with their distressed fellow-countrymen, or to have afforded reasonable support to the public relief measures, either by contributing largely from their own resources or giving their personal aid towards the supply of a suitable agency for the distribution of food.

"The total amount subscribed in all the above mentioned districts was Rs. 1,29,293-15-7; and this sum includes the contribution of all officers of Government and others who have no property in those districts. The Government revenue derived from estates situated in localities where the failure of crops and local distress were greatest is Rs. 32,79,942. Now, as the amount of the Government revenue demand in these districts, where the land-revenue assessment is light, does not, on an average, exceed one-fourth of the zemindar's receipts from his property, it will be seen from this comparison how little the landed proprietors contributed in proportion to their means, or to the amount annually derived from that portion of the country in which the incidence of severe distress operated with the most disastrous effect; and it was only in the very few instances specially mentioned in the foregoing narrative that the zemindars or landholders were found willing to undertake the superintendence of the distribution of food at the relief-centres and employment of those able to labour."

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[1] *C*, paragraph 149. [2] Paragraph 109.

[3] Paragraph 151. Mr. Geddes however states (p. 302) "the accuracy of the mortality statistics rendered "by the police officers to Mr. Cockerell was subsequently contested by the local officers, the Commissioner, "and Board of Revenue."

[4] Paragraph 11. [5] Paragraph 36. [6] Paragraphs 13, 135, 136.

[7] Paragraph 137. [8] Paragraph 27. [9] Paragraph 45. [10] Paragraphs 139, 140.

9. *Emigration.*—There are a few notices of emigration. In February 1866 the population of Northern Tirhut "commenced deserting their homesteads and migrating[1] "southwards in large numbers"; and in Gya upwards of 3,000 persons registered themselves for emigration beyond sea.[2] But, speaking generally, the pressure seems not to have been severe enough to drive the people to adopt this resource.

10. *Relief-works; system pursued.*—The relief measures adopted by Government officers were of two kinds: special works for those able to labour, and gratuitous feeding for those unable. The relief-works were not carefully planned and laid out beforehand, in spite of the long warning the officers had before the stress came upon them: they were not opened till the rains set in, at which time earth-work can hardly be usefully carried on; and though this form of relief was "better as regards its moral influence than "the mere giving of food gratutiously," Mr. Cockerell points out[3] that—

"for the lakh of rupees expended in these districts in the nominal employment of a large number of persons on public works, there is but a very small return, owing partly to the weak condition of those so employed, and the season at which the work was carried on; and that, had the money been expended some months earlier in the employment of the people on works of public utility, numbers would have been saved from either falling into the condition of helpless paupers or perishing through want. Real work would have been obtained from those employed; and the districts in which the money was so expended would have derived no inconsiderable permanent benefit."

11. *Result obtained.*—The wages given on these works were 6 pice in Champáran and Monghyr for an adult and 3 for a child; 9 to 3 pice in Shahabad on some works, and an average of 5 pice a day on others; 6 to 4 pice in Patna and Bhágalpur. Nothing is on record as to what attempts were made, or on what system, to compel them to labour; but, evidently, the results were almost *nil.* The following figures show the numbers employed and the cost of this form of relief:—

| —— | June. | July. | August. | September. | October. | November. | December. | Total. | Total Cost. | Cost per head. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Rs. | R. A. P. |
| Tirhut - - | 583 | 461 | 220 | 182 | 79 | 61 | — | 1,586 | 2,008 | 1 4 3 |
| Champáran - - | 667 | 2,338 | 1,869 | 1,846 | — | — | — | 6,720 | 11,469 | 1 11 4 |
| Sarun - - | 206 | 2,440 | 1,766 | 1,672 | 3,005 | 3,616 | 1,747 | 14,452 | 22,600 | 1 9 0 |
| Shahabad - - | — | 1,218 | 868 | 1,662 | 559 | 44 | 52 | 4,403 | 7,027 | 1 9 0 |
| Gya - - - | 117 | 117 | 123 | 195 | 317 | 317 | 317 | 1,503 | 5,944 | 3 15 0 |
| Patna - - | 969 | 1,167 | 1,399 | 2,111 | 2,111 | 1,372 | — | 9,129 | 16,305 | 1 12 0 |
| Bhágalpur - - | — | 280 | 441 | 250 | 223 | 254 | 221 | 1,669 | 4,584 | 2 12 0 |
| Monghyr - - | — | — | 838 | 1,049 | 1,382 | 517 | — | 3,786 | 8,170 | 2 2 6 |
| Santhalia - - | 727 | 1,411 | 823 | 338 | 86 | 24 | — | 3,409 | 18,774 | 5 8 0 |
| Total - - | 3,269 | 9,432 | 8,347 | 9,305 | 7,762 | 6,205 | 2,337 | 46,657 | 98,054 | 2 1 8 |

No explanation is given of these great discrepancies in the cost per head of this form of relief in different districts. Taking the four chief months during which the works were opened, the average number relieved daily during that period is 11,660.

12. *System of gratuitous feeding.*—The arrangements for gratuitous feeding were still more completely devoid of system and uniformity. No rules whatever were laid down by Government or any high authority, and each relief committee was left to decide on its own method. In most cases cooked food was given, but not always. In Sarun the introduction of cooked food reduced the number of applicants to an eighth or a tenth of what they had been, so it was abandoned and raw grain distributed. The quantity given in most cases depended on the daily allotment, and not on the number of applicants: a certain quantity was distributed every day, and divided equally amongst all who came, be they many or few. Thus, the quantity varied from a maximum of 8 chittacks or 16oz. of rice to as little as 3 chittacks a dole, which is obviously insufficient to sustain life. No particular care was taken to give (dâl) pulse with the rice, but in many cases it was given. "Dry and soaked grain flour, mixed peas and "barley, dry rice, plain cooked rice, cooked rice mixed with dâl, and Indian-corn, were "all used in different places and at different periods."[4] Nothing is said as to any test of admission, and it does not appear that residence was made a condition of relief. Under these circumstances it was probably only the smallness of the sums allotted to each day's expenditure that prevented the entire population from becoming applicants for this form of charity.

[1] Paragraph 10. [2] Paragraph 81. [3] Paragraph 145. [4] Paragraphs 146, 147.

13. *Number and cost.*—The following table gives the numbers relieved gratuitously and the cost of relief:—

| — | June. | July. | August. | September. | October. | November. | December. | Total. | Cost. | Average Cost per head. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Rs. | R. | A. | P. |
| Tirhut - - - | 3,775 | 6,788 | 11,621 | 6,856 | 4,435 | 2,481 | 695 | 36,651 | 37,440 | 1 | 0 | 4 |
| Champáran - - | 2,450 | 4,228 | 3,648 | 3,129 | — | — | — | 13,455 | 12,982 | 0 | 15 | 6 |
| Sarun - - - | 1,480 | 5,621 | 4,919 | 3,824 | 800 | 141 | — | 16,785 | 21,708 | 1 | 4 | 6 |
| Shahabad - - | — | 990 | 3,415 | 3,727 | 2,008 | 976 | 330 | 11,446 | 19,618 | 1 | 12 | 4 |
| Gya - - - | 436 | 1,085 | 1,057 | 1,146 | 379 | 90 | — | 4,193 | 6,696 | 1 | 10 | 0 |
| Patna - - | — | — | 1,522 | 2,919 | 2,399 | 1,883 | 1,197 | 9,920 | 9,926 | 1 | 0 | 0 |
| Bhágalpur - - | — | 248 | 708 | 1,019 | 676 | — | — | 2,651 | 8,287 | 3 | 2 | 0 |
| Monghyr - - | — | — | 1,058 | 2,201 | 1,774 | — | — | 5,033 | 7,048 | 1 | 6 | 0 |
| Santhalia - - | — | 94 | 1,034 | 1,321 | 447 | 200 | 58 | 3,154 | 7,444 | 1 | 6 | 0 |
| Total - - | 8,141 | 19,054 | 28,982 | 26,142 | 12,918 | 5,771 | 2,280 | 103,288 | 1,31,149 | 1 | 4 | 0 |

The average number relieved was 14,755 for the seven months that charity was given; or looking only at the four worst months, it was 25,822 daily during that period.

Bhágalpur paid far the highest for its relief; but, except in this district and Shahabad, the cost of relief was hardly sufficient to provide sustenance for a starving person at the prices then prevailing.

14. *Remedial measures for the future.*—Mr. Cockerell's report concludes by advocating three classes of remedial measures to provide against a future famine: they were—

(1) irrigation works;

(2) means of communication.

As regards both of these much has been done already, and the subject is discussed elsewhere more fully.

(3) "The creation of a special agency to collect accurate information in regard to the population, agricultural produce, and state of trade throughout the province." On this subject he says:[1]—

"164. As before remarked, many lives might have been saved, and the extreme severity of the distress greatly mitigated, if not altogether prevented, by the adoption of relief-measures at a much earlier period; that the administration of relief was not sooner undertaken is due to the district officers' want of acquaintance with the condition of the people. This want of information on the part of district officers is more or less general, and must, I think, in a great measure continue so, as the necessary condition of our existing local administrative system, by which details are sacrificed to the principle of extreme centralisation.

"168. Under an efficient administrative system, the chief revenue-officer of the district ought to have full information as to the extent and exact nature of the cultivation of the entire revenue paying lands; the incidence of the assessment fixed by the permanent settlement upon the several estates within the district, as shown in its practical operation in the division of the produce of the land between the State, the proprietor of the land and the cultivator, and the consequent effect of such partition upon the condition of the population and the wealth of the district. He should know, further, the extent of the population, the numerical strength of the classes into which it is divided, their requirements in the consumption of food, the sufficiency or insufficiency of the local produce to meet such demand, and the extent to which the supply is ordinarily supplemented or diminished by the action of an import or export trade.

"169. To acquire this statistical information, not as it may apply simply to one particular period but in respect of its variation from year to year and season to season, a special subordinate agency is required, through which the collector or chief revenue-officer could obtain reports of changes in the extent of area under cultivation, the condition of the crops, the demand for and supply of labour, the ruling prices of food and wages of labour, the result of each harvest in the out-turn of grain, the proportion of it finding its way into the market, and the condition of import and export trade and its effects on the local market.

"171. * * * The functions of the proposed department would be to take a census of the population of each district, to keep an accurate registry of the classes into which the population is divided (this would not, of course, contain the names of individuals but the number of the population of each class), and to submit for publication reports of the prices current, the state of the crops, estimates of the probable out-turn of produce, and the quantity of each kind of produce imported to and exported from each district.

"Through the same agency a general system of registration of births and deaths might be introduced. * * *"

[1] Paragraphs 164–171.

Since these remarks were written, a census has been taken, and the incorrectness of the general opinion as to the population has been exposed; but Bengal is as far off as ever from possessing a cadastral survey or any accurate knowledge of its cultivated area and the out-turn of its crops.

15. *Summary.*—The following is a summary of what has been said as to the amount and cost of relief given. Taking the number of sufferers from severe famine at a third of the population of the affected districts, or 4½ millions, the cost of relief was 10 pie per head:—

| Measures. | Average Number relieved. | Period. | Cost to Government. | Cost to Public. | Total Cost. |
|---|---|---|---|---|---|
| | | | Rs. | Rs. | Rs. |
| Relief Works - | 11,660 | 4 months | 98,054 | — | 98,054 |
| Gratuitous Relief | 25,822 | 4 months | 855 | 1,30,294 | 1,31,149 |
| Total - | - - | - - | 98,909 | 1,30,294 | 2,29,203 |

## Section III.—Madras.

Based on Mr. Dalyell's Report on Madras Famines.

*Brief Sketch of the Famine.*[1]—The seasons of 1864 and 1865 were both unfavourable (though in Madras itself the rainfall of 1865 was normal, and not much below the average), but the first warning was given from Ganjam in October 1865. Information was given to the public of the high prices, and merchants began to export rice there, the Acting Collector being forbidden to import for Government. He reported in November that though crops were bad, there was no real scarcity, and the district had produced enough for its own food. In consequence of importation, prices fell again, and no more alarm was felt till the end of January 1866, when Mr. Forbes returned as Collector to his old district, and found the state of things very alarming, and that deaths from starvation had already taken place. In February, the Board reported that the prospects of the season were bad in almost every district; but when further enquiries were made, in March and April, no Collector expressed alarm for the future, except those of Salem and South Arcot. In Ganjam, relief-houses were opened in February and March, and subscriptions solicited from the public; a relief-work was opened in April, but the large work which the Collector proposed, the excavation of the Chilka Canal, was not sanctioned for want of budget provision. In April, the Collector reported starvation deaths to be frequent, and in May the distress became more acute, and Government despatched a large supply of rice by steamer, besides granting considerable sums of money. In June, distress became more wide-spread as the rains held off, and agricultural employment was at a stand-still; and in July the alarm became general. Deaths from famine were reported in Bellary, and prices rose everywhere. The Governor (Lord Napier) visited Ganjam, and a Relief Committee was appointed in Madras. Government agreed to contribute for gratuitous relief a sum equal to the subscriptions of the public, and ordered relief works to be opened near Madras. Lord Napier wrote a gloomy account of the condition of the people in Ganjam, but said there was plenty of fodder, as repeated showers had fallen, and cattle were thriving. In North and South Arcot Mr. Ellis, who was sent on a visit of inspection, found a large number of emaciated people in the relief-houses, but the general state of the population he thought good. The Central Relief Committee distributed their funds to the different districts, to be expended in cooked food, raw grain, or doles of money at the Collector's discretion to those unable to labour. If the rains had fallen in June, Mr. Dalyell thinks the scarcity would have abated at once, but they held off, and the relief operations, which were delayed in the hope of rain and on economical grounds, came too late. Prices rose still higher in August, but in that month rain fell in Ganjam, and prospects

[1] D. pp. 80–132.

improved, and all over the Presidency the north-east monsoon was abundant, and distress began to pass off in October and November.

2. *Effect of the Famine on Prices, Trade, Crime, Emigration, and on the different Classes.*—The following facts are gleaned from the replies of District Officers to the Circular of the Relief Committee:—

*Prices.*—At Coimbatore, rice sold in September 1866 at 4½ seers, in Salem at 5½ seers, and in parts of North Arcot and Trichinopoly at 6 seers. Ragi was at one time selling at 7½ seers in the hill tracts of the Salem District. In September, ragi sold in Bellary at an average price through the month of about 12 lbs. per rupee (against 41 lbs. the previous year), and rice at 8½ lbs.; in Coimbatore and Salem, rice fetched 10½ and 14 lbs., respectively, per rupee. In Ganjam the highest recorded price was that of August, 15½ lbs.

Exports and imports by sea were not affected, about a million cwt. of food-grain being exported as usual, and the imports were rather lower than the average (8,15,000, against 11,00,000 in 1865–66, and 14,00,000 in 1864–65). Hence Mr. Dalyell draws the conclusion that high prices were due to local scarcities, not to general deficiency. In spite of high prices and distress in North Arcot, 10,000 tons were exported thence by rail to Mysore, &c.

Grain merchants, afraid of being forced to sell at a fixed price, or being looted, sent their grain away to another market usually, when prices rose very high in their own town.[1]

As to the time when distress reached its maximum, this was for Ganjam early in the year; for Bellary not till July; for other districts, Salem, North and South Arcot, Coimbatore, in August and September. After October, prices fell steadily everywhere, except in Madras, where they remained high till February 1867.

*Classes.*—The non-agricultural classes suffered most; also persons on low fixed salaries, and Musulmans. In Ganjam, the ryots suffered severely, and as they would not take cooked food, uncooked grain was issued to them. In November, 24,000 were fed in this way. Ryots in zemindary estates suffered more than Government ryots. Mr. Forbes reports very severely on the conduct of the Ganjam zemindars.

*Emigration.*—Mr. Forbes reports that many emigrated from Ganjam to the south and to Sambalpur, and 800 coolies emigrated by sea to Mauritius.[2]

*Crime.*—In every district grain thefts and robberies greatly increased. The offenders were chiefly low castes, driven to crime by want. Cattle were slaughtered, specially in the smaller and unprotected villages.

3. *Mortality.*—In Ganjam it is estimated[3] that 11,000 perished of starvation, and in one part of the district 10 per cent. of the people. Registration of deaths only began in the Presidency in June 1865, hence the statistics are not worth much; in Bellary a death-rate of 4 per cent. was registered against 1·5 after scarcity was gone. The average of the Presidency was 1·63 per cent. for the last six months of 1866, against ·87, ·88, and ·77 in the two preceding and the following periods. Hence it may be estimated that double the usual number died, or say 200,000 in excess.[4]

4. *Relief Measures.*—Many relief-houses were maintained by zemindars, rich ryots, and native gentlemen at their own expense.[5] The system approved by the Committee was that of distributing a meal a day to persons collected in an enclosure, admission to which was given by tickets. No residence was required; they were seated in rows and obliged to eat the food there, none to be carried away. The quantity is not specified, "as much was given to each as he could reasonably require." The food was rice on Sunday, cholam and ragi porridge on other days. In Ganjam,[6] though uncooked rice was given to cultivators and the respectable classes, all others were fed with cooked food in order to "check the number of applicants, which would have been unlimited had merely a distribution of uncooked rice been adopted." All comers were admitted into the enclosure, and "some person in authority then went round and ordered all who seemed undeserving of relief to leave." When the funds at the Committee's disposal

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[1] Page 107.—This seems a forced conclusion from Mr. Ellis's report, which is to the effect that, though prices might be high at home, they would send grain away to other places where it was higher rather than raise prices to the same high rate at home and incur odium.

[2] Geddes' Admin. Experience, p. 234.

[3] D., p. 112.

[4] But the true mortality of 25 millions at 35 per mille is 875,000 or 437,000 in six months. The excess should therefore be about 450,000.

[5] D., p. 114

[6] Mr. Forbes's report, quoted by Mr. Geddes, p. 157.

became large two meals a day were given. About 100 seers of rice and ragi mixed were usually found "sufficient to feed from 200 to 250 people, varying according to the pro- "portion of children to adults, and the physical condition of the recipients." In Salem and North Arcot cooked food was sent to Mahomedan women in distress by their male relatives. In rare instances small doles of money were given. Mr. Ellis adds,[1] "I heard "natives of all classes speaking in terms of approbation of the system pursued in affording "relief to the aged and infirm, and I concur in the opinion unanimously expressed in these "districts, that these houses of relief have been the means of saving many lives." In fact, except in the case of Ganjam, there is no trace in these reports of any extreme dislike on the part of the famine-stricken to receive cooked food. Large remissions of revenue were given, and public works opened wherever employment was needed by the able-bodied. But the appended table shows that though the necessity was fully recognised in July it took some time to organise the measures, and they were not in full working in Bellary and Coimbatore[2] till September :—

TOTAL NUMBER relieved in the PRESIDENCY.

| MONTHS. | Gratuitous Relief. | Relief-works. | TOTAL. |
|---|---|---|---|
| February | 584 | — | 584 |
| March | 737 | — | 737 |
| April | 1,547 | 150 | 1,697 |
| May | 2,535 | 425 | 2,960 |
| June | 5,647 | 783 | 6,430 |
| July | 21,367 | 1,572 | 22,939 |
| August | 82,945 | 6,529 | 89,474 |
| September | 93,053 | 13,999 | 107,052 |
| October | 100,359 | 16,552 | 116,911 |
| November | 79,729 | 18,268 | 97,997 |
| December | 56,587 | 25,614 | 82,201 |
| January | 27,620 | 33,019 | 60,639 |
| February | 14,049 | 28,890 | 42,939 |
| March | 6,951 | 21,435 | 28,386 |
| April | 4,656 | 8,828 | 13,484 |
| May | 3,913 | 5,393 | 9,306 |
| June | — | 968 | 968 |
| TOTAL | 502,279 | 182,425 | 684,704 |
| Average for 16 months | 31,392 | — | — |
| Average for 17 months | — | — | 40,276 |
| Average for 15 months | — | 12,162 | — |

[1] Mr. Forbes's report, quoted by Mr. Geddes, p. 161.
[2] For district details see table on the next page.

## District Details showing the Numbers in receipt of Relief in 1866–67.

| — | On Gratuitous Relief. | | | | | | | | | | | | | | | | Total number on relief. | On Relief Works. | | | | | | | | | | | | Total number employed. | Cost of gratuitous relief. | Cost of Public Works. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | February 1866. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | January 1867. | February. | March. | April. | May. | | April 1866. | May. | June. | July. | August. | September. | October. | November. | December. | January 1867. | February. | March. | April. | May. | June. | | | |
| Bellary | — | — | — | — | — | 3,613 | 15,955 | 28,693 | 32,310 | 19,938 | 15,590 | 10,158 | 6,743 | 5,019 | 3,301 | 3,113 | 144,433 | — | — | — | — | 3,090 | 8,263 | 9,500 | 11,616 | 17,492 | 19,421 | 18,109 | 15,310 | 7,467 | 4,378 | — | 114,646 | Rs. 1,06,793 | Rs. 4,47,540 |
| Karnul | — | — | — | — | — | — | — | — | 2,082 | 2,130 | 1,482 | 1,564 | 321 | 198 | — | — | 7,777 | — | — | — | — | — | 391 | 645 | 443 | 876 | 841 | — | 303 | 555 | 233 | 162 | 4,449 | 11,729 | 15,016 |
| Salem | — | — | — | — | — | 592 | 6,495 | 6,966 | 6,530 | 4,879 | 3,545 | 856 | 272 | — | — | — | 30,135 | — | — | — | 83 | 659 | 930 | 644 | 322 | 373 | 427 | 309 | 35 | — | — | — | 3,782 | 24,595 | 27,887 |
| Coimbatore | — | — | — | — | — | — | 628 | 1,558 | 1,740 | 1,909 | 1,378 | 1,161 | 789 | 657 | — | — | 9,820 | — | — | — | — | 26 | 600 | 1,182 | 1,237 | 949 | 490 | 112 | 5 | — | — | — | 4,601 | 11,798 | 19,145 |
| North Arcot | — | — | — | — | — | — | 8,133 | 8,114 | 8,021 | 5,896 | 3,890 | 964 | — | — | — | — | 35,018 | — | — | — | — | 1,404 | 2,032 | 2,950 | 2,706 | 5,000 | 5,000 | 5,000 | 5,000 | — | — | — | 29,092 | 27,450 | 1,00,000 |
| South Arcot | — | — | — | — | — | 84 | 1,436 | 2,333 | 1,779 | 1,576 | 1,356 | 1,047 | — | — | — | — | 9,610 | — | — | — | 8 | 725 | 957 | 839 | 1,108 | 568 | 636 | 4 | — | — | — | — | 4,845 | 7,490 | 15,910 |
| Trichinopoly | — | — | — | — | — | — | 2,500 | 4,166 | 3,016 | 300 | — | — | — | — | — | — | 9,982 | — | — | — | — | — | — | 172 | 39 | 46 | 43 | 43 | 43 | 43 | 43 | 43 | 515 | 4,964 | 930 |
| Madura | — | — | — | — | — | — | 4,313 | 5,375 | 5,540 | 3,892 | 4,203 | 3,407 | 2,071 | 1,077 | 1,355 | 800 | 32,033 | — | — | — | — | — | — | 60 | 310 | 310 | 6,161 | 5,313 | 739 | 763 | 739 | 763 | 15,158 | 24,024 | 19,408 |
| Malabar | — | — | — | — | — | 2,835 | 24,094 | 3,507 | 284 | 271 | — | — | — | — | — | — | 30,991 | — | — | — | — | 112 | 328 | 209 | 126 | — | — | — | — | — | — | — | 775 | 19,270 | 5,758 |
| Madras District | — | — | — | — | — | — | — | — | 240 | 290 | 290 | 290 | 100 | — | — | — | 1,210 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 1,430 | — |
| Madras Town | — | — | — | — | — | — | 1,372 | 2,318 | 3,566 | 4,271 | 3,869 | 3,335 | 3,607 | — | — | — | 22,338 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 39,604 | — |
| Tanjore | — | — | — | — | — | 3 | 145 | 4,771 | 7,579 | 3,823 | 3,183 | 2,483 | — | — | — | — | 21,987 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 17,921 | — |
| Ganjam | 584 | 737 | 1,547 | 2,535 | 5,747 | 14,240 | 17,874 | 25,252 | 27,672 | 30,555 | 17,801 | 1,855 | 146 | — | — | — | 146,445 | 150 | 425 | 783 | 1,481 | 513 | 498 | 351 | 361 | — | — | — | — | — | — | — | 4,562 | 2,10,999 | 8,968 |
| Total | 584 | 737 | 1,547 | 2,535 | 5,647 | 21,367 | 82,945 | 93,053 | 1,00,359 | 79,729 | 56,587 | 27,020 | 14,049 | 6,951 | 4,656 | 3,913 | 502,279 | 150 | 425 | 783 | 1,572 | 6,529 | 13,999 | 16,552 | 18,268 | 25,614 | 33,019 | 28,890 | 21,435 | 8,828 | 5,393 | 963 | 182,425 | 5,08,069 | 6,60,562 |

5. *Cost of Relief Measures.*—The small number on relief-works in Ganjam is explained by saying that the ordinary public works on which most of the people were employed are not included. The average cost (12,200 for 15 months at 6½ lakhs) was Rs. 3-8 a month. In Salem and North Arcot the wages were, for men 2 to 2½ annas, for women 1 to 1½ annas, for children ½ to 1 anna. The system was one of payment by daily wage without tasking, and the principles laid down by Colonel Baird Smith in 1861 were quoted by Mr. Ellis as those that should guide the management of relief-works.[1] In Bellary wages at first were 3, 2, and 1½ annas for men, women, and children respectively, till December, when they were lowered to 2, 1½, and 1. The cost of gratuitous relief was far lower, being only Rs. 16 a head for 16 months, or Re. 1 per mensem. Officers and Local Relief Committees had almost *carte blanche* in expenditure, both as to gratuitous relief and relief on works; hence it may be presumed that expenditure varied directly with the intensity of distress. Bellary and Ganjam stand highest; then North Arcot; then Salem, Madura, and Coimbatore. South Arcot, Malabar, Karnul, and Tanjore were lightly touched, and Trichinopoly still more lightly. The total expenditure on relief was about 12 lakhs, of which Government bore about 10. Local subscriptions were about Rs. 2,75,000, of which Rs. 86,000 were collected in Madras.

6. *Loss to the Revenue.*—The Board's office furnishes the following figures as to the produce of the Land Revenue and other sources of income during the famine:—

| — | Land Revenue. Demand. | Land Revenue Collections, including Arrears. |
|---|---|---|
| 1860–61 - - - | 407,89,900 | 406,13,000 |
| 1861–62 - - - | 420,90,400 | 412,14,300 |
| 1862–63 - - - | 428,61,800 | 428,46,000 |
| 1863–64 - - - | 434,21,200 | 433,87,700 |
| Average: | 422,90,800 | 420,15,000 |
| 1864–65 - - - | 425,21,300 | 423,22,300 |
| 1865–66 - - - | 431,36,000 | 420,58,200 |
| 1866–67 - - - | 441,09,000 | 436,32,500 |

This shows that there was no decrease in 1865–66 as compared with the average of the preceding years, and in 1866–67 the demand rose considerably, nor was there any decrease under the other heads of State income.

7. *Mr. Dalyell's recommendations as to Government interference with Trade.*—In the concluding chapter of his Report, Mr. Dalyell, after mentioning the importance of carrying out protective measures, as communications and irrigation works, some scheme for which he specifies, proceeds to consider the propriety of the relief measure adopted by Government, and especially the principle of non-interference with trade. He quotes the views expressed by Adam Smith and J. S. Mill on the subject, and shows that the atter admits that there may be circumstances which justify Government in interfering with private trade to the extent of obtaining supplies of food from a distance, that is, where private speculation is not likely to accomplish the end required; and also that Mr. Mill lays down that the only limit which can properly be applied to the interference of Government with its subjects is expediency, from which Mr. Dalyell infers that expediency would justify this course whenever the State has reason to fear that the people are likely to be reduced to famine in consequence of the high price of food. The fact that the Government, after declaring its adherence to the principle of non-interference, was obliged in 1807 to fix a price for imported grain, and in 1824 and 1833 to offer a bounty for its importation, shows that trade was so sluggish that high prices alone could not stimulate it to energy or tempt it out of its beaten track. He explains this by saying that traders have usually very little capital, and are slow to extend their basis of operations: and that in many Districts which ordinarily support themselves there are actually no persons engaged in the trade upon which the lives of millions may shortly become dependent.[2] He argues that the system of offering labour at money wages increases the evil, as it prevents the recipients of wages from reducing their consumption, and thus diminishes stocks which through the slackness of trade, except in coast districts, are not replenished. In conclusion he gives his opinion that the proper course for Government to take in regard to relief measures is the following:—First, relief

[1] Mr. Ellis's Report, quoted by Mr. Gedde's "Administration Experience," p. 107–8.

[2] Such was the case of Gantur where, though "grain was comparatively plentiful in several of the Madras "Districts, yet the natural course of trade, even aided by the bounties on importation, did not supply the "Gantur District with sufficient food to prevent the destruction of one-third of its inhabitants."

works should be opened in the ordinary way when scarcity is first apprehended. Then relief depôts (supplied with grain from a distance) should be opened later on, if matters become more serious. Eventually, "should it be found that prices were rising so much "beyond those ruling in neighbouring countries as to show that the grain merchants "were not importing from without, then steps should be taken by the Government to "create such a trade, either by importing on Government account, or by offering a "bounty on imports, or making advances to merchants, or any similar measure which "would have the effect of throwing a supply of grain into the distressed country."

## THE FAMINE OF 1868-69.

### SECTION I.—RAJPUTANA.

[The materials from which this Section is compiled are taken from Colonel J. C. Brooke's Report (9th December 1870), and also from scattered notices in Reports and Gazetteers, which are quoted in the margin when referred to.]

*The Famine Tract of* 1868.—The main stress of the two-years' famine of 1868-70 fell on that portion of Northern India which is known as Rajputana, and more especially on the central and western parts of it. The drought of 1868 extended only in a minor degree to parts of the Punjab, the North-Western Provinces, Central India, and the Central Provinces, but no tract in Rajputana escaped its influence, and the States of Marwar, Bikanir, and the districts of Ajmir and Mhairwara, felt it with frightful severity. The shaded map which accompanies this chapter shows better than any description can do the boundaries of the famine tract and the area most accutely affected.

2. *Brief History of the Famine.*—The seasons for several years preceding 1868, except those of 1866 and 1867, had been somewhat irregular, and prices had never fallen to their old level since the drought of 1860-61, nor had the stocks then exhausted been thoroughly replenished. The rains of 1868 began late, hardly any having fallen in June; and there was a good downpour in most parts in July, but hardly any in August and September. In Marwar it is asserted that no rain whatever fell during all these months. There are but few rain-gauges kept up in Rajputana, and the registration is imperfect; but such facts as are to be gleaned from Colonel Brooke's report are embodied in the following table:—

| Month. | Ajmir. | Jaipur. | Jodhpur. | Kherwara. | Nimach.[1] | Deoli. | Indore.[1] |
|---|---|---|---|---|---|---|---|
| June 1868 - | — | — | — | — | 1·99 | 4· | 3·13 |
| July - - - | 5·9 | 4·96 | — | Rain fell | — | 24·7 | 12·03 |
| August - - | ·5 | — | — | 18·7 | 9·57 | 1·5. | 10·82 |
| September - | ·5 | 1· | — | — | 4·30 | — | 5·93 |
| Total rainfall | 6·9[2] | 5·96 | — | — | 15·86 | 30·2 | 31·91 |
| Average rainfall of these four months - | 21·09[3] | — | — | — | — | — | — |

[1] The Indore figures are added from a report by Captain Fraser to show how Malwa kept up its historic reputation for prosperity.

[2] Mr. Henvey's report gives this figure as 6·2.

[3] Meteorological Report, 1876.

The result necessarily was a widespread failure of the kharif crop (the principal crop of this territory)—complete in Marwar and Bikanir, considerable in the eastern and southern parts and in Jesalmir, which also had been blessed by rain in September. But what was even worse than the loss of the kharif was the absolute dearth of grass, and in some parts of water; the effect of which was that it was impossible for the cultivators to feed their cattle, or for traders to carry grain over the drought-stricken country;[4] so that the communications of Rajputana with the neighbouring country were almost as much cut off as were those of Orissa in 1866. The only possible resource for the people was to emigrate; and they did this in enormous numbers. Out of the million and half that inhabited Marwar, it is calculated that a million emigrated, taking their cattle with them. Of these, it is estimated that 300,000 went to Guzerat, 300,000 to the south-east, 250,000 eastwards to Ajmir and further on, 100,000 to the Punjab districts (chiefly Hissar and Delhi), and 50,000 to Sind. The Bikanir people for the most part fled to Hissar. Those who emigrated first were the best off and had suffered least; but after a time the travellers began to arrive emaciated and diseased, through having held on too long to their homes; and when they came, they found the

[4] In Jodhpur, early in 1869, grass was the same price as wheat (B. para. 76).

pasture lands they hoped to reach already occupied by the countless herds of those who had preceded them. Efforts were made to open poor-houses for the relief of the famished; but little could be done in this way compared with the extent of the suffering that prevailed. The area sown with rabi crops was only about half its usual extent; but it promised well under the influence of rain in January and February. Eventually, however, the rainy and cloudy weather continued so long that the crops were blighted, and only one-fourth of an average harvest was stored. In the hot weather cholera broke out in Ajmir and travelled in every direction, being most severe in Marwar. A belief prevailed that the monsoon would begin very early, which was the reverse of the fact; and the emigrants who returned in the hope of finding the soil ready for tilling and sowing had to retrace their steps, marking every mile of their journey with the traces of a terrible mortality. At last the rains set in in the middle of July, and then the survivors of the emigrants returned: making small light ploughs expressly for the purpose and yoking themselves to them, while the women dropped the grain into the furrows, they sowed about half the usual breadth of land. This came up well and hopes began to be entertained that the famine was over, when the third plague —the locusts—appeared to afflict the unhappy country. Apparently the eggs laid in the long drought hatched as soon as the rains began: the locusts sprung from these, spread over the country, and laid fresh eggs in August. This second brood hatched in September just as the crops were ripened, and caused such destruction among them that the crop ultimately reaped is reckoned to have been only an eighth of the average. To crown all the misfortunes of the season, a severe epidemic of fever followed the heavy rain of September and October 1869. The people, enfeebled by long privation, were unable to withstand it and died in great numbers. Those who survived were often too weak to house the scanty harvest which the locusts had spared. Many of those who had returned to sow the kharif crop emigrated a second time, though they were now too weak and hopeless to get further than the poor-houses of Ajmir. But there was one alleviation now which had been wanting in 1868—grass was abundant; and not only were the surviving cattle able to find pasture, but the people lived to a great extent on the grass seeds, which they collected and ground to flour. Another favourable result was that importation could be resumed now that there was food for bullocks and pack-cattle; and under this influence prices, which had touched their highest point in September 1869, began to moderate. In March 1870 a good rabi crop was reaped and prices continued to fall, so that it was decided to close all relief-works and poor-houses; but distress continued to make itself manifest for some time to come.

3. *Prices.*—The following table of the price of wheat at different places in Rajputana is compiled from scattered notices in Colonel Brooke's report; the Ajmir prices are taken from Mr. Henvey's report. In Jodhpur the price of wheat is said (in Captain Barr's reply to the Famine Commission's questions) to have risen as high as three seers per rupee at the worst time.

PRICES of WHEAT (seers per rupee).

| Month. | Ajmir. | Udaipur. | Tonk. | Jodhpur. | Sirohi. | Kherwara. | Jaipur. |
|---|---|---|---|---|---|---|---|
| June 1868 | — | — | — | — | $6\frac{1}{2}$ | — | — |
| July „ | 16·4 | — | — | — | 6 | — | — |
| August „ | 15 | — | — | — | 6 | — | — |
| September „ | 10 | ·8 | 12 | — | $5\frac{3}{4}$ | — | — |
| October „ | 7·13 | — | $8^2$ | — | $4\frac{3}{4}$ | — | — |
| November „ | 7·4 | — | — | — | $4\frac{3}{4}$ | — | — |
| December „ | 7 | — | $7\frac{1}{2}$ | — | 5 | — | — |
| January 1869 | 7·9 | — | — | $6\frac{13}{4}$ | $4\frac{3}{4}$ | — | — |
| February „ | 7·10 | — | — | — | — | — | — |
| March „ | 7·9 | $6\frac{3}{8}$ | — | — | — | $11\frac{1}{8}$ | — |
| April „ | 7·3 | — | — | — | — | — | — |
| May „ | 6·5 | — | — | — | — | — | — |
| June „ | 6·4 | — | 7 | — | — | — | $7\frac{15}{4}$ |
| July „ | 6 | $4\frac{1}{2}$ | $6\frac{1}{2}$ | — | — | — | $8\frac{1}{2}$ |
| August „ | 5·1 | — | $6\frac{7}{2}^6$ | — | — | — | 8 |
| September „ | 4·5 | — | — | — | — | — | $5\frac{1}{2}$ |
| October „ | 5·12 | — | — | — | — | — | — |
| November „ | 5·12 | — | — | — | — | — | — |
| December „ | 5·12 | — | — | — | — | — | — |
| January 1870 | 6·10 | — | — | — | — | — | — |
| February „ | 7·7 | — | — | — | — | — | — |
| March „ | 7·12 | — | — | — | — | — | — |

[1] p. 78. [2] p. 98. [3] p. 76. [4] p. 90. [5] p. 102. [6] p. 100.

4 *Mortality.*—The destruction of life caused by the combined effects of famine, emigration, cholera, and fever was very great. It is estimated by Colonel Brooke that from a third to a quarter of the people perished. A census was taken of 81 villages in Mallani, a tract of Marwar, and it was found that one-fourth of the population was missing. But this part had suffered less than the average, and Colonel Brooke's estimate,[1] based on these facts, was that 480,000, or one-third, of the residents of Marwar had been lost. Bikanir suffered as much, and its mortality is estimated to have been one-third of its entire population.[2] Excluding these two States, the worst famine tract, lying between the Aravilla range and the Chambal, and between the Sambhar lake and Udaipur, an area of 27,500 square miles, with a population of about 5½ millions, is estimated to have lost 15 per cent., or 825,000. In Ajmir the deaths were estimated at 25 per cent., or 105,000.[3] In the surrounding tract, where famine, though less severe, was very distinctly felt, and where prices long continued to be extremely high, the mortality must have been considerable.

5. *Loss of Cattle.*—The loss of life among the cattle was still greater than the loss of human life. Colonel Brooke reckons that Marwar and Mallani contained before the famine three millions of cattle, and the lowest price for a pair of plough bullocks was Rs. 40. These great herds formed the main wealth of the people. Nine-tenths of them were driven away in the autumn of 1868 in search of pasture, but many of them found none, and the rest were attacked by illness from eating grasses to which they were unaccustomed. So few returned that, in July 1869, Rs. 4 was the rate usually paid for the hire of a pair of bullocks for a day's ploughing. It is estimated that hardly a tenth, or 300,000, survived this great calamity. In Bikanir also the Assistant Agent[4] reports that nine-tenths of the cattle died. The loss in other parts of the country, though not so tremendous as this, was very severe. In Ajmir it was calculated that 114,000 out of 192,000 cattle had died.

6. *Importation of Grain.*—In spite of the badness of the roads, the sparse population, and the great distances, trade is ordinarily very active in Rajputana, where several of the greatest mercantile firms in Upper India have their head-quarters. It was estimated that some 50,000 camels and 350,000 bullocks were regularly engaged in the salt trade, making three trips a year, carrying away salt to Upper India and bringing back grain. The annual amount thus imported was 25,00,000 maunds of grain.[5] The stoppage of these convoys in consequence of the want of pasture added greatly to the difficulties caused by the drought. Only camels could travel during the dry season; and the charge for freight from Agra to Ajmer[6] rose from Rs. 1-4 to Rs. 2 per maund. Special arrangements were made to facilitate the import of grain from Sind *viâ* Jesalmir, and it is estimated that about 12,00,000 maunds were conveyed by this route. Some direct importations were also made by Government into Ajmir and Nasirabad for the supply of the paupers in the poor-houses and on relief-works, and also for sale to the public, details of which will be given in the next section. The effect of these transactions, small as they were, was to stimulate and encourage the traders by showing that such ventures were possible, and would be a source of profit to them.

7. *Transit Duties on Grain.*—One of the most serious difficulties in the way of extensive importation was the extent and amount of charges imposed on the transit of grain by the different Native States through whose territory the roads ran. In Meywar alone 100 bullock loads paid Rs. 75 transit duty, and every petty prince imposed duties of the same kind. The Raja of Jaipur was the first to see the evil which this system caused, and he abolished all duties on grain in transit through his dominions, at once and for ever. Encouraged by this, Colonel Keatinge called a conference of delegates from all Native States in Rajputana; and on 18th December 1868 the following decisions were agreed to:—

(1.) The practice of forbidding export of grain and of fixing the price at which grain should be sold was abolished.

(2.) A maximum rate of 2½ annas per maund should be levied by each State, once for all, on grain in transit.

(3.) When the price of wheat reaches 8 seers (or in some Western States 6 seers)

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[1] B. para. 86. [2] Reply by Mr. Martelli, Assistant Agent.

[3] The census of 1865 returned the population as 426,000. In that of 1872 it was returned as 316,000—a loss of 110,000—which was set down as due to the famine. But this census was condemned as being carelessly taken and very inaccurate, and a special enumeration was held in 1876, by which the population came out as 396,000. I have not seen any attempt to reconcile or explain these conflicting figures (*vide* Ajmir Settlement Report, paragraph 97, and Ajmer replies to Famine Commission's questions.)

[4] Reply to questions by Famine Commission. [5] B. para. 30. [6] B. para. 138.

per rupee, all transit dues should be abolished, those prices being considered as indicative of famine.

In Jesalmir alone, as the Raja had at his expense provided water at the halting places through the desert between Sind and Jesalmir, it was arranged that he should be allowed to charge 2 annas per maund extra as a transit duty.

8. *Relief Measures in British Territory.*—The relief measures adopted by the British Government were confined to the district of Ajmir, which is the only portion of British territory lying in the famine tract of Rajputana. They consisted of opening relief-works for those able to work and poor-houses for the infirm and sick; and the figures showing the numbers relieved and the amount expended are given in the next section, as the district was then a part of the North-Western Provinces. It is only necessary here to mention two important questions of principle which were involved in the administration of the relief given in this peculiar and isolated country.

9. *Dispute as to the efficacy of the Contract System.*—Towards the end of 1868 the whole charge of relief-works was made over to the care of the Public Works Department, Colonel Forlong then being chief engineer. He fortunately had in his possession the completed plans and estimates of a large number of useful and important works, the execution of which was only delayed for want of money, and these were immediately put in hand. In December 10,000 people were employed daily; and in May the number rose to 21,000. From September 1869 to the end of March 1870 on an average not less than 10,000 labourers, who must otherwise have suffered from famine, received employment on these works. So far the results were extremely good; but the works were made over to contractors and let by them to sub-contractors, and after a time a complaint arose that only able-bodied and skilled labourers were received on the works, and that no employment was provided for the unskilled and the weak. Arrangements had been made that the contractors should admit weakly labourers,[1] and should have an allowance made to them in consideration of their doing so; but it was alleged that this arrangement was not carried out to any considerable extent, and that crowds of applicants were turned away. This statement was supported by the fact that the earthwork only cost 6 per cent. more than the sanctioned rate for ordinary labour, the allowance made to the contractors amounting only to Rs. 33,100 altogether in a total expenditure of $7\frac{3}{4}$ lakhs of rupees; and if any large number of feeble and famine-stricken labourers had been entertained, the difference between cost of relief and value of labour must have been far greater. Complaints were also made that one work had suddenly been stopped by order for want of a budget appropriation of funds; and others had practically stopped themselves, for the contractors, not having received advances, could not go on paying, and the famished people could not afford to wait till a remittance should come, and had dispersed. The officers of the Public Works Department, supported by the agent to the Governor General, Colonel Keatinge, maintained that the best course had been adopted. Strict orders had been given to the contractors to refuse no applicants for labour, and as far as was known these orders had been carried out; and even if they had not, it would have been impossible for the Department, with its small staff of three engineer officers, to have carried on anything like the same number of works or given the same quantity of relief on any other system.

10. *Measures taken in consequence of the dispute.*—The Civil officers and the Missionaries stationed at and near Ajmir were strongly opposed to the contract system; but the evils wrought by it do not seem to have been clearly realised by them till June 1869, when the Deputy Commissioner sent up an urgent remonstrance. An enquiry was then held, in the course of which it became clear that the proportion of people not fully able-bodied who were employed on the work was very small, and that some applicants had been refused admittance, while others had refused to work at piece-work rates. On this the Government ordered special relief-works to be opened under the Civil officers. High wages were given on these works at first and light or no tasks exacted, and the numbers mounted up fast, drawing away, it is said, many labourers from the contract works; but when the wage was reduced from one sufficient to buy 24 ounces of food down to 18 ounces, the numbers fell off rapidly, and continued low till the works were closed, in March 1870.

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[1] The wages to be given to the infirm were $1\frac{1}{2}$ annas, 1 anna, and $\frac{1}{2}$ anna to men, women, and children; the able-bodied by performing an ordinary task could earn $2\frac{1}{2}$, $1\frac{1}{2}$, and 1 anna respectively. The manner in which the contractors were to be compensated for the deficient tasks of the weak labourers is not explained in either this or Mr. Henvey's report. On the Public Works Department Works it is said that men could only buy 16 to 18 oz. of grain by their labour (B. paragragh 131).

11. *Summing-up of the dispute.*—In this dispute Colonel Keatinge (who as the Commissioner of Ajmir was subordinate to, but as Agent to the Governor General for Rajputana was independent of, the North-Western Provinces Government) took one side, and Sir William Muir, the Lieutenant-Governor of the North-Western Provinces, took the other. As the question is one of some importance, and has been raised during the famine of 1877 in Mysore and Madras, it is proper to quote the summing-up in which both sides have recorded their final opinions. Colonel Brooke (in paragraphs 221 and 222 of his report) writes as follows :—

"Another important question gave rise to much discussion during the progress of famine. Many objected to relief-works being performed by contract labour, in place of by departmental labour. It was said that the contractors rejected the poor and feeble, and that, though an allowance was made to them by the Public Works Department to cover the loss they were susposed to sustain by the employment of inefficient labourers, yet that they only employed the able-bodied, and appropriated the allowance made. All the extra payments, however, were made, not upon the statements of the contractors, but upon measurements of the work. An enquiry took place, and the Department were exonerated from blame. It is possible there may have been some truth in the statements. The term "able-bodied" during the famine could only be used in a comparative sense. The able-bodied had frequently families to support, and the proceeds from their labour had generally to be divided amongst its members, so that the best-paid men did not partake of enough food to keep their bodies in vigour. Even the sepoys of the Mhairwara Battalion were reported by their medical officer to be in a debilitated state in consequence of insufficiency of food from this very cause, and it cannot be regarded as surprising if daily labourers were in the same condition. The contractors may have been perfectly right when they gave the name of "feeble" to such men. Those called really feeble at such a time could not work at all, and frequently died on attempting the exertion of lifting a mattock.

Apart from this, however, the requisite number of supervisors were not available to overlook such extensive and such numerous works, had they been constructed by departmental labour. The payment alone of such vast numbers as were daily employed would have required a large staff of tellers and auditors. Colonel Keatinge was very anxious to obtain volunteers to supervise works constructed departmentally, and pressed the gentlemen of the Presbyterian Mission to undertake the duty. He offered them 50 per cent. margin above the price paid to contractors to ensure them againt loss, so long as it might be the means of affording relief to the suffering poor. Only one gentleman would undertake the duty, and eight miles of a famine relief road was made over to him, with an appropriation of Rs. 20,000. But keeping the accounts and working departmentally entailed so much labour and difficulty, that in eight months this gentleman had only spent Rs. 2,800 upon the road, and the relief afforded was consequently very small. In this case the departmental system failed. By the contract system labour and food were being administered to thousands ; and though now and then there may have been irregularities by grasping contractors, yet it was not the rule. The works were closely supervised by executive officers, who were most energetic during the famine in relieving distress and narrowly watching the action of the contractors. The very fact of poor-houses having been established by the Public Works Department at the works themselves shows how many of the really feeble flocked to them."

Mr. Henvey (pages 120-21) on the part of the North-Western Provinces Government writes as follows :—

"The most weighty arguments, however, are those which are meant to prove that, speaking generally, the contract is preferable to the direct system. In these arguments it is tacitly allowed that the tendency of a contract system is to exclude infirm and weakly labourers. The exclusion has been sought to be justified on the following grounds. That it is questionable whether work should be demanded from the feeble in times of famine: such people require nursing, and not labour ; their constitutions are impaired by starvation, and few even of those temporarily relieved survive the disastrous effects of the famine. The support of the feeble poor saves few, and diminishes the stock available for the able-bodied and partially feeble. The able-bodied are the thews and sinews of the State, and should be preserved still more than the infirm. Relief-works are of more value when they give employment to the able-bodied than when they are permitted to degenerate into mere feeding-places. Famine works should, therefore, be devoted exclusively to providing labour for the able-bodied and comparatively feeble, and the weak should be regarded as fitting recipients of pure charity. The Government of the North Western Provinces arrived at a different conclusion. It started with the declaration that lives must be saved. No utilitarian distinction was drawn between the value to the State of the young and strong, as compared with the old and feeble. All were to be rescued from starvation by every means possible to human skill and foresight. Subordinate to this grand object were two considerations. First, that the outlay of public money on the preservation of life should be economical ; and second, that relief should be given in such a way as to produce as little demoralisation as possible among the recipients, with as thorough a sifting of the needy as the circumstances admitted. Now, it is contended that contract work is insufficient to avert starvation. The contractors will not employ those who are unable to give adequate return for their wages ; and practically rejection of applicants cannot be prevented. On the other hand, the wages given to the able-bodied afford no more than a bare subsistence for themselves. What, then, under such a system becomes of the aged and tender, the old men, women and children, the families of those able-bodied men whom the contractors are employing? They must die or go to the poor-house, or be employed on some other principle. But to let them die is out of the question. And it is held that, unless incapable of work, they ought not to receive gratuitous relief. This was the rule observed in our poorhouses. Exaction of work acts as a check on pauperism, and is the only practical test of real want."

12. *Treatment of foreign applicants for relief.*—The other important principle involved was the treatment of foreign immigrants. When the relief-works in Ajmir

were opened, it was anticipated that they would be flooded by applicants from Native States, and that[1] "not 10 per cent. of the people employed on famine relief-work would "be British subjects"; and accordingly Government sanctioned the rule that foreign applicants should be rejected, and that every man should bring a certificate from his tahsildar showing his place of residence in British territory. Practically, however, it seems that this restriction was not needed, as the foreign immigrants very rarely accepted work, and expected to be fed gratis.[2] But the charitable relief-houses were beset by swarms of applicants, thousands of whom came from Marwar. At first the Ajmir Committee proposed to refuse them food, and to refer them to the Agent of the State from which they came for support. But it was pointed out that not only a small official like the local Agent, but even the Ruler of the Native State himself, could not afford to supply relief to all his people. Marwar, for instance, had lost its entire revenues, and out of its population of 1½ millions a million had emigrated: it was impossible for the Raja to pay for the gratuitous support of all of these. "The "calamity was beyond all calculation, and no ordinary rules could be applied to its "mitigation. The relief of the suffering was a burden thrown on the charity of "Hindustan."[3] The Bombay Government and the Bombay traders, who are closely connected with the people of Marwar, fortunately came forward at this juncture with liberal contributions to help the local resources, and it never was found necessary (even if it had been right) to turn any applicant away.

13. *Relief measures in Native States.*—Adverting now to the relief measures adopted in Native States, we find that at the British cantonments of Deoli, Nimach, and Erinpura poor-houses were established by the exertions of the local officers and supported by the public liberality. Among Native Chiefs, the Maharana of Udaipur took the lead: his relief-works cost him Rs. 1,97,000, besides a contribution of Rs. 1,80,000 to a road under the Public Works Department. Raw grain was distributed (it is not said for how long) to 8,250 people a day in six towns, and cooked food (a small dole of about 5½ ounces each) to 10,700 daily in four towns.[4] He also provided food for the Marwar immigrants, and altogether he expended about 5 lakhs of rupees. The Raja of Jaipur opened relief-works, employing about 75,000 people in 1868; and in August 1869 started the distribution of cooked food in his city, 1,800 people being relieved there daily in September, and 1,200 in October: revenue was remitted to the extent of 1 lakh of rupees. The Raja of Marwar[5] did very little at first, but ultimately subscribed Rs. 11,000 to the poor-houses where his emigrants were fed, and opened some relief-works in and near Jodhpur. He was seriously crippled by the famine, for out of a yearly revenue of 30 lakhs he lost 12 lakhs in 1868–69, and 10 lakhs in 1869–70. But Dr. Moore (in his reply to the Famine Commission's questions) relates that 10 maunds of grain were scattered daily for the wild pigs in his hunting preserves at a time when the people were dying of famine, and nothing was being done for their relief. Some of his Thakurs employed famine labour in building five tanks for irrigation. The Raja of Bondi did nothing. The Raja of Kotah set apart Rs. 36,000 for charitable relief; but, "owing to gross mismanagement in the State, it is doubtful if it ever "reached those for whom it was intended. The late Minister is said to have inhumanly "monopolised the whole of the grain of the country, which he held back till prices had "reached their highest point."[6] The Maharaj Rana of Jhallawar behaved very liberally, and expended Rs. 80,000 on relief-works, at which cooked food was given. His loss of revenue was about Rs. 60,000, or 5 per cent. of his revenue.[7] In Tonk a poor-house was organised and relief-works opened; and as the resources of the State were very low, a lakh of rupees was borrowed from the British Government to carry out these measures, which cost Rs. 94,215. In January to March 1869, 1,900 persons were employed daily on the works. The Bikanir State, according to Colonel Brooke,[8]

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[1] B., paras. 114, 115.

[2] B., paras. 215, 216. Colonel Brooke discusses the cause of this peculiarity, and considers it rather creditable to the dignity and self-respect of the cultivators in Native States. It is doubtful though if he has found the true reason. The same peculiarity has been observed in many parts, and of immigrants from British as well as from Native States. Perhaps, the explanation is, that an immigrant either has an object in view and cannot be deterred from making for it, or else has none, and is too restless and demoralised to settle down to work anywhere. The same characteristic of refusing to work was noticed regarding the Marwar immigrants into Guzerat in 1812–13, and noticed with infinite disgust. But on this occasion they seem to have been fairly willing to labour in Sindh and Guzerat. (See Sec. V.)

[3] B., para. 217.

[4] This charity (according to Major Cadell, Political Agent, in his reply to Famine Commission's questions) cost the Maharana Rs. 75,000.

[5] B. para. 191.

[6] B., para. 200.

[7] Reply to questions, Captain Abbott, Political Superintendent.

[8] Para. 207.

did nothing at all; but the Assistant Agent, Mr. Martelli, reports[1] that Rs. 60,000 were spent on charitable relief, and that the revenue was reduced by a half. Major Powlett,[2] however, states that the Raja, while refusing to assist his starving people, spent Rs. 40,000 in buying birds and beasts to form a menagerie. In Dholpur, as reported by the Political Agent,[3] there was great mortality and much emigration; but nothing was done towards relief. In Rewa[4] three annas in the rupee were remitted to all tenants in crown lands (khalsa), and, besides this, a third of the revenue could not be collected. Relief-works (tanks and roads) were opened, on which some thousands were employed (being paid in cooked food, 20 to 24 ounces to each male adult), and an eighth of the year's revenue was spent; besides Rs. 72,000 distributed by the Raja himself in charitable relief.

14. *Conduct of the Native Chiefs.*—Colonel Brooke's report ends with some valuable remarks on the enlightened conduct of the younger as opposed to the older school of Chiefs in Rajputana. In previous famines (though there are some noble instances on record of great public works undertaken to employ the famine-stricken) the ordinary course was for the Chiefs "to feed thousands of Brahmins with sweetmeats, or to give "their weight in silver or gold to a sacred shrine, and to take no care for the widow or "the orphan." Now, "duties on grain were suspended, public works commenced for "famine-relief, charitable institutions opened and fostered, and every anxiety shown "for the succour of distress." In former times "advice for the relief of the really poor "would have been listened to and applauded, but nothing would have been really "done." On this occasion too the representatives of the old school, the Chiefs of Jodhpur, Bikanir, Kotah, and Bondi, did next to nothing; but the younger Princes, the Chiefs of "Udaipur, Jaipur, Kishengarh, and Jhallawar, all of whom associate much "with European gentlemen, were conspicuous for these charities—and none more so "than the young Maharana of Udaipur."

## Section II.—The North-West Provinces.

This section is compiled from Mr. Henvey's Report: (Allahabad 1871).

1. *General description of the famine tract.*—This Province felt only the fringe of the calamity, the full force of which fell on Rajputana.[5] The part which suffered most was the trans-Jumna tract, which includes a portion of Muttra, Agra, and Allahabad, the whole of Banda, Hamirpur, Jalaun, Jhansi, and Lalitpur. In the two latter districts the famine was severe. In the Upper Doab, as far down as the east border of the Aligarh district, there was considerable pressure arising from drought; but the extent to which irrigation from canals and wells had been developed warded off famine. In Rohilkhund the drought was not more severe, and the failure not more complete than in the Doab; but the means of irrigation were wanting, and the stocks ran low, and could not be replenished for want of facility of communications. This led to a temporary scarcity and to a great panic later on in the season, when fear of famine had mostly passed away.

2. *Brief history of the famine of* 1868–69.—The rainy season of 1868 was a very irregular one. The total downfall of the year was only 20·3 inches over the whole province, against an ordinary fall of 36·3 inches. Rain fell in June; but this was followed by a month of drought. In the middle of July there were several days of heavy rain, which kept alive for some time the crops sown in June; but again a season of drought succeeded. About the 12th September a great storm of rain came up from

[1] Reply to Famine Commission's questions.
[2] Ditto. ditto.
[3] Ditto. ditto. Major Dennehy.
[4] Ditto. ditto. Captain Bannermann.
[5] Ajmir, which now belongs to Rajputana, has been spoken of in Section I, and is not referred to here as part of the famine tract of the North-Western Provinces; but the numbers relieved, and the cost of relief, are included in the tables in paragraphs 20, 24, and 29.

the east, and did not dissipate itself till it had reached Farukhabad, Mainpuri, and the eastern districts of Rohilkhund. All the country that felt its beneficial influence revived, and not only reaped a moderately fair kharif crop, but sowed its rabi under favourable conditions. West, however, of the line thus drawn, through Bareilly southwards, little or no rain fell. The kharif, though not burnt up with dry west winds (for the wind was from the east all August and September, and was moist though hot), gave a very poor yield; and the soil was mostly too dry to sow the rabi without artificial irrigation. The winter rains, which were rather behind time, not falling till the end of January and the beginning of February, were abundant when they came; and the crops which had survived till then on dry lands benefited greatly. In Rohilkhand, however, and the trans-Jumna the area sown was small, and these parts continued to suffer till the crops of the next rainy season were ripe.

On the 11th December the Lieutenant-Governor issued an appeal to public charity, and appointed a Central Committee at Allahabad to receive and distribute subscriptions; but on the 17th February, prospects having improved so greatly through the fall of rain and the large importations, he issued a notice that subscriptions would no longer be required. The continuance of high prices, however, prolonged the distress in an unexpected manner; and it was not till the rain crop was nearly ripe that warning was given that all poor-houses would be closed in a month's time. In effect, the famine came to an end in October: all poor-houses and relief-works were closed by the end of that month.

3. *Statistics of rainfall.*—The following is a statement of the rainfall in the affected districts:—

| District. | 1st June to 30th September. | | 1st October to 31st January. | | 1st February to 31st May. | | 1st June to 30th September 1869. |
|---|---|---|---|---|---|---|---|
| | Average. | 1868. | Average. | 1868–69. | Average. | 1869. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Saharanpur - | 31·10 | 12·5 | 1·95 | 2·2 | 3·72 | 5·5 | 15·6 |
| Muzaffarnagar - | 28·12 | 11·1 | 1·71 | 1·0 | 3·32 | 5·2 | 16·4 |
| Meerut - - | 24·20 | 13·5 | 1·17 | 2·9 | 2·72 | 2·9 | 12·8 |
| Bulandshahr - - | 24·01 | 11· | 1·56 | 1·1 | 2·02 | 1·8 | 13·9 |
| Aligarh - - | 21·53 | 11·8 | 1·60 | 1·0 | 1·87 | 1·8 | 17·1 |
| Bijnor - - - | 32·14 | 19·5 | 1·71 | 2·1 | 3·28 | 3·7 | 25·2 |
| Moradabad - - | 34·18 | 16·4 | 1·66 | 1·4 | 2·94 | 2·6 | 20·7 |
| Budaun - - - | 29·55 | 11·9 | 1·67 | ·8 | 1·40 | 1·3 | 17·4 |
| Bareilly - - | 36·67 | 24·4 | 2·02 | 1·1 | 2·78 | 1·9 | 29·2 |
| Shahjahanpur - - | 32·75 | 16·5 | 2·23 | 1·0 | 2·61 | ·8 | 21·5 |
| Muttra - - | 24·55 | 12·1 | ·99 | 1·1 | 1·47 | 1·9 | 15·1 |
| Agra - - - | 23·87 | 12·2 | 1·12 | ·8 | 1·42 | 1·0 | 19·2 |
| Farukhabad - - | 27·21 | 11· | 2·07 | ·5 | 1·37 | ·6 | 18·5 |
| Mainpuri - - | 26·53 | 8·8 | 2·06 | 1·1 | 1·36 | ·9 | 22·3 |
| Etawa - - | 25·21 | 12·4 | 2·04 | ·9 | 1·34 | 1·5 | 23·1 |
| Etah - - - | 24·76 | 10·8 | 1·24 | ·9 | 1·55 | 1·2 | 18·1 |
| Cawnpore - - | 25·84 | 15· | 1·78 | ·4 | 1·37 | 1·0 | 24·6 |
| Fatehpur - - | 28·29 | 17·4 | 1·83 | ·2 | 1·0 | 1·0 | 24·8 |
| Allahabad - - | 32·76 | 24· | 3·46 | ·1 | 1·36 | ·5 | 27·7 |
| Banda - - - | 32·0 | 20·7 | 1·87 | ·2 | 1·14 | 1·5 | 28·2 |
| Hamirpur - - | 31·92 | 15·5 | 1·65 | ·5 | ·88 | 1·2 | 28·8 |
| Jalaun - - - | 29·49 | 11·8 | 1·13 | ·0 | ·80 | 1·4 | 25·4 |
| Jhansi - - | 32·25 | 14·5 | 2·13 | ·5 | ·92 | ·9 | 37·8 |
| Lalitpur - - - | 37·10 | 11·3 | 1·36 | ·8 | 1·65 | ·9 | 39·5 |
| Ajmir - - | 21·09 | 6·2 | 1·31 | ·1 | 1·31 | 1·1 | 16·9 |
| General average - | 28·52 | 14·1 | 1·72 | ·9 | 1·82 | 1·7 | 22·3 |

Columns 2, 4, and 6 are taken from the Meteorological Report for 1876.
Columns 3, 5, 7, and 8 from Mr. Henvey's Report, Appendix II.

4. *Area and population of the famine tract.*—The following table shows the area and population of the famine tract of 1868–69, divided into its three main portions :—

| Class. | District. | Population by census of 1865. | Cultivated area. | Irrigated area. | Dry. | Kharif. | | Rabi. | |
|---|---|---|---|---|---|---|---|---|---|
| | | | By Administration Report, 1868-69. | | | Ratio of loss. | Loss of food grains, in maunds. | Ratio of loss. | Loss of food grains, in maunds. |
| | | | Acres. | Acres. | Acres. | | | | |
| Acute (South-west corner). | Lalitpur | 248,000 | 243,000 | 24,000 | 219,000 | ¾ | 750,000 | ½ | 530,000 |
| | Jhansi | 357,000 | 417,000 | 22,000 | 395,000 | ⅘ | 1,100,000 | ½ | 915,000 |
| | Total | 605,000 | 660,000 | 46,000 | 614,000 | — | 1,850,000 | — | 1,445,000 |
| Severe (Trans-Jumna and west half of Rohilkhund). | Jalaun | 406,000 | 603,000 | 19,000 | 584,000 | ½ | 1,060,000 | ⅓ | 880,000 |
| | Banda | 724,000 | 889,000 | 8,000 | 881,000 | ½ | 1,560,000 | ½ | 1,300,000 |
| | Hamirpur | 521,000 | 752,000 | 13,000 | 739,000 | ½ | 1,320,000 | ½ | 1,100,000 |
| | Muttra ½ | 400,000 | 350,000 | 50,000 | 300,000 | ¾ | 1,100,000 | ½ | 440,000 |
| | Agra ½ | 771,000 | 600,000 | 250,000 | 350,000 | ¾ | 2,490,000 | ½ | 1,130,000 |
| | Bijnor | 691,000 | 574,000 | 33,000 | 541,000 | ½ | 1,010,000 | ½ | 1,260,000 |
| | Moradabad | 1,095,000 | 808,000 | 436,000 | 372,000 | ½ | 1,420,000 | ½ | 1,220,000 |
| | Bareilly | 1,381,000 | 1,012,000 | 244,000 | 768,000 | ⅓ | 1,190,000 | ½ | 1,480,000 |
| | Total | 5,989,000 | 5,588,000 | 1,053,000 | 4,535,000 | — | 11,150,000 | — | 8,810,000 |
| Slight (Doab and east half of Rohilkhund). | Saharanpur | 866,000 | 782,000 | 162,000 | 620,000 | ½ | 1,380,000 | ½ | 1,140,000 |
| | Muzaffarnagar | 682,000 | 650,000 | 343,000 | 307,000 | ½ | 1,140,000 | ½ | 720,000 |
| | Meerut | 1,200,000 | 1,031,000 | 578,000 | 453,000 | ½ | 1,210,000 | ⅙ | 560,000 |
| | Bulandshahr | 800,000 | 776,000 | 321,000 | 455,000 | ⅗ | 910,000 | ⅙ | 430,000 |
| | Aligarh | 926,000 | 903,000 | 534,000 | 369,000 | ⅔ | 1,050,000 | ⅛ | 500,000 |
| | Muttra ½ | 400,000 | 350,000 | 269,000 | 81,000 | ⅔ | 470,000 | ¼ | 440,000 |
| | Agra ½ | 257,000 | 210,000 | 185,000 | 25,000 | ½ | 270,000 | ⅛ | 140,000 |
| | Fatehpur | 681,000 | 539,000 | 235,000 | 304,000 | ½ | 480,000 | ⅙ | 310,000 |
| | Allahabad | 1,393,000 | 990,000 | 345,000 | 645,000 | ⅓ | 430,000 | ⅛ | 540,000 |
| | Mirzapur | 1,054,000 | 813,000 | 200,000 | 613,000 | ½ | 360,000 | ¼ | 890,000 |
| | Budaon | 890,000 | 829,000 | 201,000 | 628,000 | ½ | 970,000 | ⅛ | 1,220,000 |
| | Shahjahanpur | 1,017,000 | 688,000 | 344,000 | 344,000 | ½ | 610,000 | ¼ | 760,000 |
| | Total | 10,166,000 | 8,561,000 | 3,717,000 | 4,844,000 | — | 9,280,000 | — | 7,650,000 |
| | GRAND TOTAL | 16,760,000 | 14,809,000 | 4,816,000 | 9,993,000 | — | 22,280,000 | — | 17,905,000 |

This area corresponds very closely with that of the famine tract of 1860–61; and if it is more extensive, the reason is chiefly because more districts which were only slightly affected have been included in this than in Colonel Baird Smith's list. But the centre of the calamity has been displaced, and, instead of lying along the banks of the Jumna, it has been removed south-westward.

5. *Estimate of the loss caused by the drought.*—An attempt has been made to show the degree of protection which each district received from its means of irrigation, and the amount of loss it suffered. The latter estimate is very problematical, being made so long after the event. An estimate was made, however, at the time as to the average and actual rabi outturn. To this an estimate of the kharif outturn has been added, which is based on the reports sent up at the time, and corrected here and there in the light of subsequent events. The outturn of the kharif in the famine tract was, according to this estimate, about three-fifths and of the rabi three-fourths of an average crop. The loss is estimated at 22,280,000 maunds in the autumn and 17,500,000 maunds in the spring crop, or altogether 39,780,000 maunds, being a year's food for nearly nine millions of people. The value of this at ordinary, not famine, prices (reckoning kharif grains to sell at 30 and rabi at 20 seers), is Rs. 6,47,00,000, or a loss of nearly $6\frac{1}{2}$ millions sterling. And this is independent of the loss in non-food crops, covering 1,700,000 acres, which can hardly be put at less than two millions sterling. The food-crop that was raised in the two harvests I estimate at 80,000,000 maunds, or more than 5 maunds per head of the population of the affected districts—a quantity just sufficient for food and for seed-grain, had it remained in the province and not been drained away by a sharper demand elsewhere. As to the amount of irrigation (the figures for which are

taken from the Administration Report of 1868–69), it is obvious at a glance to what cause the districts in the slightly affected part owed their immunity. They suffered as much from the inclemency of the skies as the Rohilkhund districts did, or those on the southern border of the Jumna; but they were largely helped to surmount their difficulties by the aid of wells and canals. In the worst tract the irrigated area is only 7 per cent. of the whole; in the medium tract it is 19 per cent.; in the slightly affected it is 43 per cent.

6. *Comparison of* 1860–61 *with* 1868–69.—Comparing this famine with that of 1860–61, the general conclusions seem to be as follows. The failure of the south monsoon was not so complete, and a smaller proportion of the kharif crop was lost: the outturn of the rabi also was much larger. Moreover, the years preceding this drought had been better than the years 1859 and 1860. But the area of the famine was far greater. Instead of receiving supplies from the Punjab and Central India, the Province was drained of its stocks by the demands of those countries as well as of Rajputana, and only received supplies from Oudh and Bengal. Thus the area of high prices was enlarged, and the period during which they lasted was prolonged. Instead of emigration proving a refuge to the suffering population, the province received a vast number of immigrants from the more severely famine-stricken neighbourhood, and these added to the scarcity and to the mortality. But on the whole, except in Lalitpur and Jhansi, the famine, though wasting and prolonged, was not so acute in the North-Western Provinces as that of 1860–61.

7. *Prices.*—The following statement shows the average price of wheat at the seven principal stations[1] in the most affected part of the province, month by month:—

| | | Seers per Rupee. |
|---|---|---|
| July | 1868 | 23· |
| August | „ | 19·9 |
| September | „ | 13·8 |
| October | „ | 13·14 |
| November | „ | 12· |
| December | „ | 11·13 |
| January | 1869 | 12·12 |
| February | „ | 12·12 |
| March | „ | 12·13 |
| April | „ | 14·3 |
| May | „ | 14·4 |
| June | „ | 13·11 |
| July | „ | 11·13 |
| August | „ | 10·6 |
| September | „ | 10·5 |

Wheat was much cheaper than it had been at the beginning of the drought of 1860-61, and it never went up quite as high as it did in 1861; but it continued high over a much longer time, and it was not till the end of 1870 that it fell to 20 seers per rupee again. The fall in April and May was due no doubt to the effects of a fair average harvest; but the continued drain to the west carried off the surplus supplies, and reduced the stocks so dangerously low, especially in Rohilkhund, that there was for a short period, in August and September, a panic of alarm and a revival of distress, although the rains were abundant and favourable, and an excellent crop was fast approaching maturity.

8. *Mortality.*—Putting aside Ajmir, which falls under Section I. of this abstract, there were few deaths admittedly due to the famine in the North-Western Provinces. This was the natural effect of the order holding the district officer responsible that no such deaths occurred. In the Bijnor district the number of such deaths was believed to be about 3,000 to 4,000; in Jhansi 218 were reported; and in Lalitpur 500. But the mortuary registration of the province, imperfect as it then was, still showed the great increase in mortality which, as it is now well known, always accompanies, not famine only, but scarcity and high prices. The number of deaths registered in 1868 was 319,886, or 10·8 per mille; in 1869 it was 529,753, or 17·9 per mille, an excess of 210,000 deaths. There was an increase of 53,000 under cholera, 73,000 under fever, and 60,000 under small-pox. The Sanitary Commissioner (Dr. Planck)[2] pointed to the insufficient and unwholesome food as a a principal cause of the deaths attributed to fever. As the number registered in 1868 was only a third of the number that really died, and

[1] The complete details of the price-currents are to be found in Mr. Henvey's Appendix X., pp. XXXIX—LXII, from which this abstract has been made. The seven stations chosen are Meerut, Aligarh, Moradabad, Bareilly, Muttra, Agra, and Jhansi.

[2] Paragraph 9, Sanitary Report for 1869.

the same deficiency probably existed in 1869, the excess mortality of that year cannot have been less than 600,000.[1]

9. *Loss of cattle.*—The loss of cattle was very large in some parts, and special returns were called for, according to which more than 1,150,000 cattle perished in the drought. But there were no data by which the ordinary death-rate could be separated from the excess mortality due to drought. Mr. Henvey[2] suggests, with hesitation, that 500,000 pairs of plough-cattle may have perished, which is a good deal larger than Colonel Baird Smith's estimate (300,000 pairs) of the losses of 1860.

10. *Crime.*—The country was as free from violent crime as in 1861, but, as then, there was a great increase in the number of petty thefts and robberies, which rose from 43,000 in 1867 to 63,000 in 1869. Cattle thefts alone fell off: cattle were not worth stealing in a year of drought.

11. *Classes that suffered.*—It was generally observed that it was not the agricultural classes who suffered in 1869, but the field-labourers, the village artizans, the poor urban population, and, above all, the weavers. In Lalitpur and Jhansi, however, the prosperity (always doubtful there) of the agricultural community received a severe blow. Many emigrated who did not return; the population had fallen off considerably[3] when the census of 1872 was taken as compared with the census of 1865, and much cattle died. Recent reports have stated that these two districts have never since that year regained any degree of prosperity, but have gone on from bad to worse.

| | [3] Census of | |
|---|---|---|
| | 1865. | 1872. |
| Jhansi - | 357,442 | 317,826 |
| Lalitpur - | 248,146 | 212,628 |

12. *Relief measures adopted by the people:* (1) *Emigration.*—Of the three methods usually adopted by the Native public to meet the distress caused by drought,—emigration, irrigation, and importation,—the former, emigration, did not come into play to any great extent, because the North-Western Provinces were so much less affected than the neighbouring territories, that they formed an asylum of refuge to the more afflicted residents of Bikanir, Marwar, Gwalior, &c. Only from Jhansi and Lalitpur a certain number, following immemorial custom, betook themselves in search of plenty to Malwa. Eventually, those who did not perish by the way,—a scanty remnant,—returned on finding that Malwa was involved in as deep suffering as their own country.

13. (2) *Irrigation.*—The second natural remedy,—irrigation,—was employed with the utmost assiduity. The canals, which had only irrigated 730,000 acres in the famine of 1860-61, and which, under all the outlay and extension of distributaries that had gone on since then, had never reached a higher figure than 983,990 acres, in 1868-69 supplied water to 1,441,890[4] acres. An attempt was made to encourage cereals at the expense of some food-crops like indigo and sugarcane,[5] but it does not seem to have had much effect. Altogether 1,178,558 acres were under food-crops, and may be roughly estimated to have produced 14 million maunds of food, or enough to feed 3½ millions of people for a year. The irrigated area of the famine tract, as calculated in the table in paragraph 4, is 4,816,000 acres. Deducting the canals, we have 3,374,000 acres irrigated in ordinary years by wells, ponds, and rivers. The latter sources of supply are nowhere very abundant in the North-Western Provinces, and in a year of drought would fail almost entirely; we shall probably be safe in deducting[6] the odd 374,000 acres on this account, leaving 3 million acres watered by wells. Half this area, or 1½ million acres, would be under a rabi crop in one year; the other half would be under kharif crops, and in a year when rain fails well-irrigation can do little to replace the deficiency for those crops, as they require too much and too frequent a supply of water. But, looking to the rabi or spring crop alone, we have 1,500,000 acres irrigated by wells, or a slightly larger area than that under canals, and producing at a rough estimate 18 million maunds, or food for 4½ millions of people. Thus, out of the population of the famine tract, 16¾ millions of people in the North-Western Provinces, food for 8 millions, or almost a half, was supplied by the irrigated lands of the province. In making this

[4] Henvey, p. 113.
The details were thus given in the Irrigation Report of the year:—

| | Acres. |
|---|---|
| Ganges Canal - - - | 1,078,399 |
| Eastern Jumna Canal - | 274,101 |
| Dun Canal - - - | 14,223 |
| Rohilkhund Canal - - | 70,803 |
| Bijnor Canal - - - | 3,052 |
| Bundelkhund Lakes - - | 1,340 |
| Total - | 1,441,918 |

[1] In Lalitpur the census of 1872 showed a decrease of 35,000 as compared with 1865.
[2] p. 126.
[5] Henvey, p. 6.
[6] Such calculations may appear arbitrary; but they will be found to be justified by the detailed figures given in the North-Western Provinces reply to questions 3 and 4, chapter I, of the Famine Commission's questions.

estimate, it has been assumed that only normal industry was applied and an average outturn obtained. But there is evidence that the industry shown was very abnormal; that the resources of the wells were stretched to the utmost; that second crops were taken off the land after the ordinary crop had been reaped, and that special attention was paid to the putting down quick-growing crops producing large quantities of food. Carrots are pre-eminently such a crop; and it is recorded that many thousand acres were planted with carrots in the Bulandshahr and Aligarh districts.

14. (3) *Importation.*—Trade was exceedingly active in its efforts to meet the wants of the country; but the amount of exports and imports were not so registered or brought together as to make it possible to show with certainty what amount of food-grain was carried into the distressed districts, and from whence it came. Oudh poured in great quantities into Rohilkhand, and sent $1\frac{2}{5}$ million maunds (50,000 tons) to Cawnpore. Bengal sent 800,000 maunds of rice by rail; and altogether the line carried $4\frac{1}{4}$ million maunds, or 150,000 tons, in the first half of 1869. On the other side, from Cawnpore Agra, and Muttra together, $1\frac{1}{2}$ million maunds of grain were exported by road to Central India, and about three-quarters of a million were carried by rail to the Punjab. The river and the canal were also very actively employed in the carrying trade. For about two months, from 13th January to 15th March, the Government caused the rates of railway freight for grain to be reduced, thus forcing the railway to give a bounty on the carriage of grain, compensation[1] for which was paid to them. According to Mr. Henvey's report[2] there are no data for any conclusion as to the effect this bounty produced: whether it was pocketed by the trader, or was passed on to the consumer in a lowered price, or whether it had the effect of at all stimulating a trade which was already so active and vigorous. Grain was also exempted from tolls at ferries and octroi-barriers, and the compensation paid to the toll-collectors amounted to Rs. 25,086.

15. *Relief measures adopted by Government.*—The measures adopted by the Government (Sir William Muir was then Lieutenant-Governor) resembled closely those taken by Sir G. Edmonstone in 1860-61. In July, when the monsoon threatened to fail, a warning circular was sent out to district and canal officers; the people were to be stimulated to make the best possible use of the canal water, and to dig wells wherever practicable, and plans were prepared for useful relief-works. Later on, when the extent of the loss was better known, the means adopted for meeting it were those of relief-works and gratuitous relief. In recounting what was done under these heads it will not be necessary to relate the system adopted, except so far as it differed in any respect from that already described as adopted in 1861.

16. (A.) *Relief works. Principles laid down.*—The principles laid down by the Government of India in the orders of 26th September 1868 were mainly as follows. Money wages, as a rule, should be given, calculated as being just sufficient to buy the necessary quantity of food. The rates commonly given on former occasions had been—

| | |
|---|---|
| Men - - | - $1\frac{1}{2}$ annas. |
| Women - - | - 1 anna. |
| Children - - | - $\frac{1}{2}$ anna. |

If more than this was ever given (the orders did not contemplate giving less), care should be taken that a full day's work was given in return. Wages should be paid daily, huts provided where necessary, and arrangements made for proper supplies of food. Task-work (or, as it is now called, "piece-work," "the payment depending directly on the quantity of work done,") was discouraged as rarely possible. "It is essential that "enough to support life shall be given, whatever be the physical powers of the labourer; "and all that can be expected is to take reasonable precautions to prevent deliberate "idleness or refusal to work." Minor district works might be carried on by district committees; larger works should be taken up by the Public Works Department; and all such works should be of permanent utility.

17. *Difference between system of* 1860–61 *and* 1868–69. *Encouragement of minor local relief-works.*—The main point on which there was any practical difference in the system of carrying out relief-works was that they were much more numerous than in 1860–61. In that famine ten large works were opened, and the famine-stricken, generally speaking, were expected to go to them. Minor relief-works were carried on under

[1] This compensation amounted to Rs. 6,50,000. As the imports benefited the Punjab and Central India as well, Mr. Henvey has debited the North-Western Provinces with half the amount, or Rs. 3,25,000: *vide* paragraph 31. The rate was reduced to $\frac{1}{8}$ of a pie per maund or nearly $\frac{1}{2}d.$ per ton per mile, which is believed to be approximately the actual cost of carriage. (*See* Resolution, Government of India, P.W.D., 28th October, 1873.)

[2] p. 121.

district officers, but to a very limited extent, and the labourers on them were paid in cooked food. This restriction was now abandoned. In twenty districts works were opened, often several in one district, under the Civil Officers; and these appear to have had their usual effect of attracting many who were not in actual need of relief. In Agra (Henvey, p. 24) it was reported that "the very poorest people were not employed. About four-fifths belonged to neighbouring villages; many of them were wives of the poorest classes sent to work by their husbands, who themselves earned wages in the fields." The principle adopted was that those who were fully able-bodied should be sent to the larger works; those who were feeble or unskilled, but still able to do some labour, should be employed on the minor works; but, as usual, it was found impossible to give much effect to this distinction. Besides these minor local relief-works, eight large and important works or sets of works were carried on by officers of the Public Works Department. Three of these (the Agra Canal, three out of four of the Rohilkhand Canals, and the Meerut drainage works) were not specially famine works, though the employment offered was a great relief to local distress, but were carried out in the ordinary departmental way by contracts. The rest were specially devised and arranged for the relief of famine labourers who were drafted on to them, sometimes from great distances, by Civil officers, and who received daily wages. In two cases,[1] towards the end of the famine, the system of petty contracts or piece work was introduced and worked with much success, care being taken at the same time not to make this system imperative, but to provide daily labour gangs for the infirm and feeble, who could not earn a subsistence at piece work rates.

18. *Value and cost of labour on relief-works.*—It was on this occasion that the principle was first laid down that the actual value at ordinary rates of every relief-work should be estimated and debited to the work, the excess cost due to the employment of unskilful or feeble labourers being charged as famine expenditure. In accordance with this ruling,[2] out of Rs. 18,61,020 expended on such works, Rs. 5,34,382, or 30 per cent., was thus debited to famine, the balance, or 70 per cent., being the actual cost of the works. This proportion naturally varied much in different cases, and it was best in those works superintended by professional agency. The following details are gleaned from Mr. Henvey's report. In Bijnor[3] (district roads and clearing the Nagina Canal) the waste is said to have been fearful. In Budaon[4] (9 district roads) the earthwork cost Rs. 2–1 per thousand cubic feet. In Hamirpur[5] 52 miles of road cost Rs. 988, instead of Rs. 260 per mile, the total cost being Rs. 51,380, and the value Rs. 13,520. In Banda[6] the different works (roads and a new tank) cost from Rs. 3–4 to Rs. 9–6 per thousand cubic feet. In Mirzapur[7] the roads cost from Rs. 460 to Rs. 789 per mile, and the earthwork on 3 tanks cost from Rs. 5–2 to Rs. 6–1 per thousand cubic feet. In Jhansi[8] "the rates were ruinous and the work badly done." In Lalitpur,[9] where the labourers were chiefly employed on tanks hastily planned, and where both the works and the labourers were too numerous for efficient supervision, the cost ran higher than anywhere else: the earthwork cost Rs. 30–8 per thousand cubic feet in one case, Rs. 14 in another, Rs. 13 to Rs. 11¼ in others. On the Moradabad-Tigri road[10] (under professional superintendence) the work cost Rs. 15 to Rs. 18 at first per thousand cubic feet; and, as order and system were gradually introduced, it was brought down to Rs. 3½. On the other three[11] works carried on by the Public Works Department as special famine relief works the figures are as follows:—

| | Cost. | Value. |
|---|---|---|
| | Rs. | Rs. |
| Eastern Ganges Canal - - - | 80,341 | 60,504 |
| Timli Pass - - - - - | 91,019 | 81,361 |
| Kachla Ghât - - - - | 25,631 | 17,095 |

A very sensible difference in ratio is thus shown between the wastefulness of famine labour when supervised by Civil and by Engineer officers.

19. *Wages on relief-works.*—The wages on relief-works appear to have followed in most cases the rates recommended by the Government of India, but there were some exceptions. In Bijnor[12] men coolies were cut down to 1 anna in April and 9 pie in June 1869; women to 9 and 6 pie; and men doing women's work, *i.e.*, carrying baskets, were mostly paid as women. Infants and children unable to work received 3 pie after May 1869—the first instance on record of this allowance being made. In Bareilly also,[13]

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[1] Henvey, pp. 105–106. [2] Henvey, p. 112. [3] *Ib.*, p. 31. [4] *Ib.*, p. 43.
[5] *Ib.*, p. 54. [6] *Ib.*, p. 57. [7] *Ib.*, p. 62. [8] *Ib.*, p. 70. [9] *Ib.*, p. 75-6.
[10] *Ib.*, p. 104. [11] *Ib.*, pp. 101, 103, 106. [12] Henvey, p. XXXI. [13] *Ib.*, p. 39.

when the numbers became very large, rates were lowered to 1 anna, 9 pie, and 6 pie for men, women, and children respectively.

20. *Statistics of relief-works.*—The earliest relief-works were open in September 1868 in Jalaun, Jhansi, Lalitpur, and Ajmer, and they were all closed in October 1869, except in Ajmer. The district details are shown in a separate table, and the following are the monthly numbers :—

| Month. | Number daily employed. | Number of districts in which relief-works were open. |
|---|---|---|
| 1868. | | |
| September | 3,540 | 4 |
| October | 5,509 | 6 |
| November | 17,681 | 7 |
| December | 23,746 | 10 |
| 1869. | | |
| January | 58,332 | 16 |
| February | 86,249 | 18 |
| March | 93,977 | 19 |
| April | 107,631 | 18 |
| May | 101,057 | 16 |
| June | 65,863 | 16 |
| July | 40,978 | 14 |
| August | 59,420 | 14 |
| September | 58,543 | 14 |
| October | 24,585 | 10 |
| November | 6,390 | 1 |
| December | 4,921 | 1 |
| 1870. | | |
| January | 6,555 | 1 |
| February | 8,798 | 1 |
| March | 10,228 | 1 |
| Total | 785,003 | |
| Average of 19 months | 41,737 | |

# RELIEF WORKS.

## Average Number of Labourers employed daily during each Month of the Famine.

| — | 1868. | | | | 1869. | | | | | | | | | | | | 1870. | | | Cost per head per mensem. | Average number employed during continuance of the works. | Total cost. | Average number for twelve months. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | September. | October. | November. | December. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | January. | February. | March. | | | | |
| | | | | | | | | | | | | | | | | | | | | R. A. P. | | R. | |
| Saharunpur - - | — | — | — | — | 2,597 | 3,874 | 2,317 | — | — | — | — | — | — | — | — | — | — | — | — | 2 11 0 | 2,948 | 23,925 | 737 |
| Muzaffarnagar - - | — | — | — | 68 | 234 | 235 | 879 | 271 | 137 | 101 | 99 | 223 | 80 | 19 | — | — | — | — | — | 3 1 0 | 195 | 6,583 | 179 |
| Meerut - - - | — | — | — | — | 712 | 764 | 857 | 486 | 42 | — | — | — | — | — | — | — | — | — | — | 2 3 0 | 568 | 6,259 | 237 |
| Muttra - - - | — | 50 | 251 | 135 | 130 | 605 | 548 | 791 | 637 | 422 | 556 | 385 | 498 | 87 | — | — | — | — | — | 3 0 0 | 393 | 15,558 | 426 |
| Agra - - - | — | 62 | 62 | 62 | 95 | 941 | 1,144 | 894 | 723 | 381 | 68 | — | — | — | — | — | — | — | — | 2 13 0 | 443 | 12,103 | 369 |
| Etah - - - - | — | — | 118 | 65 | 61 | 72 | 65 | 41 | — | — | — | — | — | — | — | — | — | — | — | 2 6 0 | 71 | 1,040 | 35 |
| Bijnor - - - | — | — | — | 1,741 | 2,464 | 2,787 | 18,697 | 14,089 | 10,697 | 3,414 | 3,957 | 7,376 | 6,530 | 1,485 | — | — | — | — | — | 1 12 0 | 6,679 | 130,931 | 6,122 |
| Moradabad - - - | — | — | — | — | 54 | 475 | 708 | 441 | 443 | 297 | 176 | 2,115 | 1,182 | — | — | — | — | — | — | 2 12 0 | 657 | 16,353 | 493 |
| Bareilly - - | — | — | — | — | 379 | 379 | 379 | 379 | 225 | 192 | — | 5,339 | 4,801 | 1,152 | — | — | — | — | — | 3 5 0 | 1,469 | 43,231 | 1,102 |
| Shahjehanpur - - | — | — | — | — | — | — | — | — | — | — | — | — | 332 | 151 | — | — | — | — | — | 2 6 0 | 292 | 1,132 | 49 |
| Budaun - - - | — | — | — | — | — | — | — | — | — | — | — | 7,000 | 3,500 | — | — | — | — | — | — | 2 5 0 | 5,200 | 23,922 | 867 |
| Terai - - - - | — | — | — | — | — | 1,140 | 384 | 53 | — | — | — | — | — | — | — | — | — | — | — | 3 8 0 | 527 | 5,421 | 132 |
| Fatehpur - - | — | — | — | — | — | 85 | 1,617 | 4,506 | 8,646 | 1,841 | 413 | 275 | 362 | — | — | — | — | — | — | 1 8 0 | 2,244 | 26,241 | 1,496 |
| Allahabad - - - | — | — | — | 540 | 2,303 | 2,688 | 1,992 | 1,945 | 3,384 | 2,173 | 566 | — | — | — | — | — | — | — | — | 2 4 0 | 2,013 | 35,773 | 1,342 |
| Hamirpur - - | — | — | — | — | 70 | 1,232 | 3,402 | 7,089 | 4,867 | 3,432 | 2,868 | 2,082 | 2,167 | 630 | — | — | — | — | — | 3 0 0 | 3,466 | 102,373 | 2,888 |
| Banda - - - - | — | — | — | — | — | — | 163 | 1,296 | 10,943 | 6,266 | 883 | 434 | — | — | — | — | — | — | — | 1 14 0 | 3,259 | 37,230 | 1,629 |
| Mirzapur - - | — | — | — | — | 2,443 | 3,097 | 4,580 | 4,210 | 4,117 | 3,007 | — | — | — | — | — | — | — | — | — | 2 10 0 | 3,460 | 110,247 | 1,730 |
| Jalaun - - - - | 312 | 312 | 312 | 312 | 312 | 1,085 | 1,085 | 1,091 | 766 | 773 | 129 | 129 | 159 | 159 | — | — | — | — | — | 2 8 0 | 491 | 17,538 | 573 |
| Jhansi - - | 58 | 120 | 112 | 181 | 1,593 | 3,685 | 6,139 | 7,509 | 4,352 | 3,921 | 2,127 | 1,476 | 1,200 | 412 | — | — | — | — | — | 2 5 0 | 2,210 | 71,888 | 2,568 |
| Lalitpur - - - | 1,617 | 2,955 | 4,639 | 5,455 | 18,620 | 20,273 | 8,176 | 18,612 | 12,123 | 5,295 | 1,474 | 3,085 | 1,020 | — | — | — | — | — | — | 2 2 0 | 7,954 | 220,429 | 8,617 |
| Ajmir Civil Relief Works | — | — | — | — | — | — | — | — | — | — | — | 1,918 | 12,688 | 4,239 | 1,325 | 1,800 | 2,700 | 3,678 | 2,514 | 3 0 0 | 4,113 | 100,186 | 2,742 |
| Ditto P. W. D. Works - | 1,500 | 2,010 | 5,000 | 8,000 | 10,736 | 17,585 | 16,002 | 20,454 | 21,151 | 17,054 | 12,029 | 12,044 | 9,110 | 7,591 | 5,065 | 3,121 | 3,855 | 5,120 | 7,514 | 4 3 0 | 9,740 | 774,000 | 15,422 |
| Agra Canal - - | — | — | 7,187 | 7,187 | 7,187 | 7,187 | 7,187 | 7,187 | 7,187 | 7,187 | 7,187 | 7,187 | 7,187 | 7,187 | — | — | — | — | — | 4 11 0 | 7,187 | 431,188 | 7,187 |
| Rohilkhund Canal - | — | — | — | — | 521 | 3,821 | 3,300 | 3,300 | 455 | 455 | 455 | 455 | 455 | 455 | — | — | — | — | — | 4 4 0 | 1,367 | 59,594 | 1,139 |
| Meerut Irrigation - | — | — | — | — | 839 | 839 | 839 | 839 | 839 | 839 | 839 | 839 | 839 | 839 | — | — | — | — | — | 6 4 0 | 839 | 52,880 | 699 |
| Ramganga Doab Canal - | — | — | — | — | — | — | — | — | — | 5,000 | 6,075 | 6,946 | 6,435 | 179 | — | — | — | — | — | 3 6 0 | 4,985 | 80,341 | 2,077 |
| Timli Pass - - - | — | — | — | — | 6,382 | 8,332 | 8,489 | 6,906 | 5,522 | 2,869 | — | — | — | — | — | — | — | — | — | 2 6 0 | 6,402 | 91,019 | 3,201 |
| Moradabad Tigri - | — | — | — | — | 600 | 3,591 | 3,970 | 3,250 | 1,437 | 500 | 500 | — | — | — | — | — | — | — | — | 2 14 0 | 1,636 | 32,634 | 954 |
| Kachla Ghat - - | — | — | — | — | — | 1,477 | 1,058 | 1,992 | 2,364 | 444 | 577 | 112 | — | — | — | — | — | — | — | 3 2 0 | 1,130 | 25,630 | 659 |
| Total - - | 3,540 | 5,509 | 17,681 | 23,746 | 58,332 | 86,249 | 93,977 | 107,631 | 101,057 | 65,863 | 40,978 | 59,420 | 58,545 | 24,585 | 6,390 | 4,921 | 6,555 | 8,798 | 10,028 | 3 3 8 | 81,938 | 25,55,564 | 65,671 |

Dividing the entire number employed by the whole period of 19 months, the average daily number relieved throughout was 41,937. But for the last five months the works were only open in Ajmir, and during the first two months the numbers were very small. Taking the period during which this form of relief was really active, or the 12 months from November 1868 to October 1869, the average daily number was 65,671. The entire cost of this relief was Rs. 25,55,569,[1] or Rs. 3-3-8 per head per mensem. Of the number employed, 31,338, or nearly half, were employed by the Public Works Department, at an average rate of Rs. 4-1-10 per mensem; and 34,333, or rather more than half, on the district civil works, at an average wage of Rs. 2-7-2 per mensem. This class of labourers, therefore, received very little more than those fed in poor-houses, who cost Rs. 2-4-3 per head per mensem; and although their work was not worth much, it can hardly be supposed that it was not worth a good deal more than the difference between these two figures.

The number relieved nowhere bore a very high proportion to the affected population. The ratio is highest in Ajmir, where, out of a population of 426,000, 18,164, or 4·3 per cent., were employed for 12 months consecutively, and in the worst month 21,154 or 5 per cent. In Lalitpur, with a population of 248,000, 20,273, or 8·2 per cent., were relieved in the worst month, and 8,617, or 3·5, for 12 months continuously.

21. *Other kinds of relief-works.*—These numbers do not show quite all the relief that was given in this way. A few works were started by Local Fund Committees and several by Municipalities, as to which no distinct record exists; but they do not amount to much. The Public Works Department also employed its usual labourers on the ordinary budgetted works of the year, which were not interfered with.

22. (B.) *Gratuitous relief. Change in principle.*—With regard to charitable relief a slightly different position was taken up from that which had been adopted by Government in previous cases. The former principle had been that the relief of the helpless was the duty of the public, and that Government would only assist public charity by contributing a sum equal to the amount of the local subscriptions; but this principle had grown up under conditions which differed from the present. In 1837–38 and in 1860–61 the N. W. P. was the chief sufferer, and the helpless poor were the residents of the province. In 1868–69 Rajputana was the chief sufferer, and this province was inundated with immigrants from that country. It could not reasonably be held that the relief of these immigrants was the special duty of the inhabitants of the North-Western Provinces. Accordingly the formula was altered. It was laid down that charitable relief should be given, as before, by drawing on the liberality of the public, aided by an equivalent from Government; but that the duty of Government did not end with the payment of that equivalent, and that, "if public charity should fail from any cause, the "Government must step in to save life."[2] It was on this occasion that the famous sentence was issued for the first time, that "every district officer would be held per-"sonally responsible that no deaths occurred from starvation which could have been "avoided by any exertion or arrangement on his part or that of his subordinates."

23. *System of poor-houses.*—There is nothing special to notice regarding the system under which the poor-houses were managed, as it seems in all respects to have conformed to the model set in Moradabad in 1861, and the rules laid down by the Government of India in September 1868. It is noticeable that no allusion is to be found in Mr. Henvey's report to any unpopularity of the system or any vehement dislike of the conditions prescribed—residence and cooked food. Indeed, in one district, Hamirpur, it is recorded[3] that a considerable number of the recipients of relief in poor-houses were Brahmins.

A very large number also were foreigners, chiefly immigrants from Native States. Thus in December 1868 nearly half the residents[4] in the Jhansi poor-houses (4,431 out of 9,660) were subjects of Gwalior, Dattia, and Tehri. In May 1869 nearly half the residents in the Lalitpur poor-houses (1,880) were foreigners from the same States.

24. *Statistics of poor-house relief.*—The earliest poor-houses were opened in September 1868 in Jhansi and Lalitpur, and the latest (Bareilly) was closed in December 1869.

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[1] These figures differ considerably from those in Mr. Henvey's, page 107, because I have included the numbers employed by the Public Works Department in Ajmir and their cost (the figures of which are contained in Colonel Brooke's report), and have also corrected some minor errors.

[2] Henvey, p. 5. [3] Henvey, p. 53. [4] *Ib.*, p. 70.

Ajmir, however, continued open till March 1870. The district details are given in a separate table, and it is sufficient to notice here the monthly totals.

| Months. | Average daily number of Inmates. | Number of Districts in which Poor-houses were open. |
|---|---|---|
| September 1868 | 301 | 2 |
| October „ | 412 | 2 |
| November „ | 638 | 4 |
| December „ | 1,086 | 4 |
| January 1869 | 3,425 | 8 |
| February „ | 10,892 | 15 |
| March „ | 17,142 | 16 |
| April „ | 16,116 | 17 |
| May „ | 14,048 | 17 |
| June „ | 16,735 | 16 |
| July „ | 20,943 | 17 |
| August „ | 28,690 | 20 |
| September „ | 26,517 | 21 |
| October „ | 7,718 | 11 |
| November „ | 2,325 | 6 |
| December „ | 1,342 | 2 |
| January 1870 | 1,276 | 1 |
| February „ | 1,660 | 1 |
| March „ | 515 | 1 |
| Total | 172,781 | — |
| Average of 19 months | 9,094 | — |

The total number fed, if distributed equally over the 19 months, give a daily average of 9,094; but if we take the 9 months in which relief was really given to any considerable extent, February to October inclusive, the daily average distributed over those 9 months is 18,675. The total cost of this relief came to Rs. 3,80,757,[1] so that each inmate cost Rs. 2–4–3 per head per mensem. The total number is much smaller than that relieved in 1861, and the cost per head a good deal larger: this is probably due to the higher price of provisions and the disproportionate cost of establishments in some poor-houses, which had very few inmates. Thus in Muzaffarnagar, which had an average number of 41 for 7 months, the cost per head was Rs. 7–2. In Ajmir the number continuously relieved for 9 months is less than 1 per cent.; and in Lalitpur less than 2 per cent. of the population. In no other district does it rise to 1 per cent.

25. *Parda-nashin women, and Travellers.*—As in 1861, parda-nashin women of respectable families were relieved at home without enforcing the condition of residence in a poor-house; this kind of charity was chiefly resorted to in Bijnor and Moradabad. Travellers also were fed whenever they applied for help in their wanderings, and a separate register of them was kept: the districts where they were most numerous were Lalitpur and Muttra.

[1] These figures disagree slightly with those in Mr. Henvey's page 108, in which I have corrected a few minor errors.

# GRATUITOUS RELIEF.

## Average Number relieved daily during each Month.

| — | 1877. | | | | 1878. | | | | | | | | | | | 1879. | | | Average number. | Cost per head per mensem. | Total cost. | Average number for nine months. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | September. | October. | November. | December. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | January. | February. | March. | | R. A. P. | R. | |
| Saharunpur | — | — | — | — | 210 | 232 | 223 | 131 | 35 | — | — | — | — | — | — | — | — | — | — | 161 | 3 8 0 | 2,795 | 89 |
| Muzaffarnagar | — | — | — | — | 56 | 69 | 70 | 48 | 1 | — | — | 8 | 32 | — | — | — | — | — | — | 41 | 7 2 0 | 2,659 | 82 |
| Meerut | — | — | — | — | — | 132 | 20 | 98 | — | — | — | — | — | — | — | — | — | — | — | 63 | 4 6 0 | 1,134 | 21 |
| Muttra | — | — | — | — | — | 109 | 61 | 55 | 70 | 101 | 200 | 343 | 401 | 339 | — | — | — | — | — | 187 | 1 2 0 | 1,868 | 187 |
| Agra | — | — | — | — | 16 | 107 | 261 | 493 | 547 | 588 | 574 | 252 | 242 | 131 | — | — | — | — | — | 329 | 3 0 0 | 10,374 | 366 |
| Faruckabad | — | — | — | — | — | 406 | 138 | 93 | 98 | 118 | 134 | 225 | 168 | 87 | — | — | — | — | — | 152 | 3 7 0 | 4,771 | 152 |
| Etawah | — | — | — | — | — | 30 | 30 | 30 | 30 | 30 | 19 | 44 | 193 | — | — | — | — | — | — | 37 | 1 2 0 | 338 | 33 |
| Mainpuri | — | — | — | — | — | — | — | — | — | — | — | 75 | 46 | — | — | — | — | — | — | 58 | 1 10 0 | 196 | 13 |
| Bijnor | — | — | — | — | — | 1,829 | 6,229 | 4,264 | 1,521 | 1,468 | 1,750 | 2,553 | 2,184 | 668 | — | — | — | — | — | 2,254 | 2 4 0 | 45,119 | 2,254 |
| Moradabad | — | — | — | — | — | — | — | — | — | — | — | 3,260 | 2,271 | — | — | — | — | — | — | 3,081 | 2 5 0 | 14,316 | 685 |
| Bareilly | — | — | — | — | 45 | 330 | 135 | 207 | 104 | 107 | 178 | 1,037 | 683 | 452 | 103 | 16 | — | — | — | 300 | 3 1 0 | 11,141 | 400 |
| Shahjehanpur | — | — | — | — | — | — | — | — | — | — | — | 2,141 | 2,141 | — | — | — | — | — | — | 2,141 | 1 1 0 | 3,738 | 476 |
| Budaun | — | — | — | — | — | 353 | 820 | 250 | — | 220 | 2,208 | 4,780 | 3,008 | — | — | — | — | — | — | 1,654 | 1 9 0 | 17,640 | 1,286 |
| Allahabad | — | — | — | — | — | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 299 | 269 | — | — | — | — | 269 | 4 0 0 | 10,546 | 299 |
| Jaunpur | — | — | 13 | 31 | 29 | 11 | 30 | 30 | 65 | 70 | 21 | — | — | — | — | — | — | — | — | 31 | 1 12 0 | 495 | 31 |
| Hamirpur | — | — | — | — | — | — | 200 | 483 | 728 | 916 | 895 | 740 | 768 | 137 | 15 | — | — | — | — | 546 | 1 10 0 | 7,906 | 546 |
| Banda | — | — | — | — | — | — | — | 24 | 38 | 180 | 195 | — | — | — | — | — | — | — | — | 109 | 2 3 0 | 749 | 48 |
| Benares | — | — | — | — | — | — | — | — | — | — | — | 710 | 1,975 | 788 | — | — | — | — | — | 1,319 | 1 3 0 | 4,790 | 439 |
| Ghazipur | — | — | — | — | — | — | — | — | — | — | 701 | 701 | 701 | — | — | — | — | — | — | 701 | 0 12 0 | 1,593 | 234 |
| Azamgarh | — | — | — | — | — | — | — | — | — | — | — | — | 275 | 185 | 30 | — | — | — | — | 165 | 0 14 0 | 429 | 55 |
| Mirzapur | — | — | — | — | — | — | — | — | 128 | 128 | 128 | 128 | 128 | — | — | — | — | — | — | 128 | 1 8 0 | 834 | 71 |
| Jalaun | — | — | — | — | — | — | — | — | 68 | 149 | 162 | 164 | 104 | — | — | — | — | — | — | 130 | 1 12 0 | 1,115 | 72 |
| Jhansi | 95 | 112 | 149 | 492 | 1,081 | 2,573 | 2,878 | 3,132 | 3,431 | 4,803 | 5,126 | 4,589 | 4,179 | 1,505 | 99 | — | — | — | — | 2,284 | 2 4 0 | 7,788 | 3,807 |
| Lalitpur | 206 | 300 | 437 | 484 | 1,727 | 3,653 | 4,471 | 4,842 | 4,303 | 5,378 | 5,623 | 4,720 | 2,721 | — | — | — | — | — | — | 2,781 | 1 11 0 | 61,442 | 4,017 |
| Ajmir | — | — | 19 | 79 | 261 | 789 | 1,807 | 1,667 | 2,612 | 2,210 | 2,760 | 1,951 | 4,028 | 3,257 | 1,809 | 1,326 | 1,276 | 1,660 | 515 | 1,621 | 3 8 0 | 96,886 | 3,062 |
| Total | 301 | 412 | 638 | 1,086 | 3,425 | 10,892 | 17,142 | 16,116 | 14,048 | 16,735 | 20,943 | 28,690 | 26,517 | 7,718 | 2,325 | 1,342 | 1,276 | 1,660 | 515 | 20,542 | 2 4 3 | 380,757 | 18,675 |

26. *Relief based on personal knowledge.*—In the Native State of Rampur another system of relief was tried. Money was entrusted to the headmen of villages to distribute to those in need; and the result is said to have been successful. But no information was collected as to the amount expended or the number thus relieved.

27. (C.) *Suspension and remission of Revenue.*—At the end of the revenue year 1868–69 about 15 lakhs[1] of rupees were suspended on account of the drought, and of these rather more than 4 lakhs were classed as doubtful. In the orders passed on the Revenue Report, the Government estimated that it would probably be necessary to remit 4 lakhs, or 40,000*l.* In the end, however, only Rs. 2,20,000 were remitted, and all the rest were collected.[2] These unexpectedly large collections are attributable to the prosperity which, as far as agriculturists were concerned, followed the good harvest and high prices of the autumn of 1869.

28. (D.) *Takavi advances.*—Takavi advances for seed-grain and bullocks, and for works of permanent utility, such as wells, were given largely; and up to the end of February 1870, when the special sanction was withdrawn, about 10 lakhs of rupees were distributed, chiefly in the districts of Jhansi, Lalitpur, and Bijnor.

29. (E.) *Importation of food.*—Although the principle of non-interference with trade was rigidly laid down and strictly carried out, three cases occurred in which it was considered necessary for Government to step in, as trade appeared to be unable or unwilling to throw in the required supplies of food into certain distressed localities. One instance was the south of Mirzapur, a wild and hilly tract, into which, in January and June 1869,[3] food to the value of Rs. 7,500 was despatched by the Collector, and sold and distributed to the labourers in lieu of wages. In this transaction a loss of only Rs. 82 was experienced. The second instance was in Jhansi, where, in July 1869, the stocks had been very short, and the rainy season had made the roads almost impassable. For a short time a panic set in, and "no grain could be bought in the city at any "price" till the Commissioner wrote to the Collector of Cawnpore to arrange for the importation of Rs. 10,000 worth of grain. It seems that the knowledge of this order quieted the alarm, and caused the local stores to be brought out; but the actual pecuniary details of the transaction are not reported.[4] The third, and by far the most important, instance, was that of Ajmir.[5] The alarm was first given by the Commissioner in September 1868; he got leave to purchase grain to the amount of 1 lakh of rupees, both for distribution as wages and also to ensure the town and troops against a failure of supplies, as it was feared that Native speculation would not suffice to meet the emergency. But his actual purchases were comparatively small, it being found that the local merchants were answering to the stimulus of official encouragement and of high prices, and that all possible means of transport were being utilised. A more serious alarm was felt in September 1869. It was represented that wheat and bajra were then selling at 4 seers per rupee in Ajmir—a sure indication of failing stocks; and that it was necessary to secure a supply for the relief-works and troops, and also for retail sale. It was extremely difficult to obtain carriage, and the petty Chiefs imposed exactions on the transit of grain. Government, therefore, the measure being said to be necessary to save life, reluctantly sanctioned the purchase of 8,000 maunds of grain at Agra, to be escorted by military and police. These transactions were, as usually occurs in such cases, conducted at a considerable loss. Altogether 19,467 maunds (700 tons) of grain were purchased by Government and laid down at Ajmir at a total cost of Rs. 1,13,839. Of this, 12,493 maunds were sold, when pressure was most severe, for Rs. 55,300; 6,416 maunds were issued as food and wages, at an estimated value of Rs. 36,400; 578 maunds were lost by wastage. The total loss on the transaction was Rs. 21,241. The cost of carriage was enormous. One consignment, for which Rs. 15,000 was paid at Allahabad, cost Rs. 11,000 more before it reached Ajmir; on another, the price of which at Agra was Rs. 32,648, the cost of transport to Ajmir was Rs. 14,325. Large quantities of the grain (though carefully examined before despatch) were found to be weevil-eaten on arrival; and all the despatches were found at Ajmir to be short weight, having been extensively plundered on the road. The actual cost to Government in cash, deducting the amount received by sales from the total expended on purchase and carriage, was Rs. 57,820. No figures exist by which the value of the grain distributed as wages or as food can be allotted to the proper heads of relief-works or gratuitous relief.

30. (F.) *Public charity.*—A Central Relief Committee was appointed which sat at Allahabad, and whose functions were to supervise the administration of gratuitous relief,

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[1] Henvey, Appendix IX. [2] *Ib.*, pp. 9, 110. [3] Ib., p. 61.
[4] *Ib.*, p. 67. [5] *Ib.*, pp. 92-95.

and to collect subscriptions from the public. These contributions amounted to Rs. 67,432, while the officials of the different districts also collected locally subscriptions to the amount of Rs. 1,27,712, making a total of Rs. 1,95,144. To this Government added from the Treasury a sum of Rs. 1,97, 416, making altogether a total of Rs. 3,92,560. Out of this, Rs. 5,000 were spent in part-payment of one of the despatches of grain to Ajmir, and the rest covered the expenditure on gratuitous relief.

31. *General Summary.*—The following table sums up, in abstract, the amount of relief afforded to the famine-stricken, its cost, and the way in which that cost was shared between the Government and the charitable public :—

| Nature of Relief. | Duration of Relief. | Average Daily Number relieved. | Cost. | Cost to Government. | Cost borne by Public Charity. |
|---|---|---|---|---|---|
| | | | Rs. | Rs. | Rs. |
| Relief-works | 12 months | 65,671 | 25,55,569 | 25,55,569 | — |
| Gratuitous relief | 9 months | 18,675 | 3,87,560 | 1,97,416 | 1,90,144 |
| Exportation to Ajmir | | | 62,820 | 57,820 | 5,000 |
| Remissions of revenue | | | 2,20,000 | 220,000 | — |
| Advances (recoverable) | | | 10,16,201 | 10,16,201 | — |
| Compensation to Railway | | | 3,25,000 | 3,25,000 | — |
| Compensation to contractors of tolls and ferries | | | 25,086 | 25,086 | — |
| Total | | | 45,92,236 | 43,97,092 | 1,95,144 |

The total cost of the relief given from all sources amounts to 4 annas or sixpence per head on the affected population. But in the district which suffered most of all, Ajmir, the relief of all kinds given to the famine-stricken amounted to Rs. 11,24,000,[1] or nearly Rs. 3 per head of the population of the district, and almost exactly two years income of the land revenue.

## Section III.—The Punjab.

[Compiled from Captain Wace's reply to the famine Commission's questions.]

*Brief History of the Famine in the Punjab.*—In the Punjab the failure of the rain of 1868 extended to the same tract as was visited by drought in 1860, the country between the Sutlej and the Jumna; but Gurgaon and Delhi, which bore the severest brunt in 1860, were now more lightly affected, and the worst part was the Hissar Division (containing the Hissar, Rohtak, and Sirsa Districts) and the Karnal District. The previous season had not been good, but still prices were lower in June 1868 than they had been for some years previous. The rainfall of the year was 25 inches, against an average of 30 for the province, but it was ill-distributed, for between April and October only 16 inches fell, and it ceased almost entirely in August and September. The result was a poor kharif crop everywhere, and a total loss of the crop in the Hissar Division and in Karnal. The Hissar Division was also especially troubled by the influx of starving immigrants from Bikanir. Relief-works were begun in Hissar in October, and the Lieutenant-Governor sanctioned the supension of the revenue demand wherever Commissioners were satisfied that the realisation of it would cause severe distress.[2] A Central Relief Committee was also appointed and the contributions of the public invited. The rabi area was necessarily much restricted by the dryness of the soil, and the prospects of this crop also were very gloomy till, in the end of January, heavy rain began to revive it and continued throughout February. Prospects were so much improved by this, that on the 22nd March the Central Committee gave notice that subscriptions were needed no longer. In June

[1] Colonel Brooke, para. 214, has included 5 lakhs spent on Military buildings in Nasirabad, which I have excluded as they can hardly be said to have had any relation to the famine-stricken people.

[2] The canal irrigation increased thus:—

| | 1867–68. | 1868–9. | 1869–70. |
|---|---|---|---|
| West Jumna Canal | 331,037 | 486,878 | 496,542 |
| Bari Doab Canal | 262,455 | 299,935 | 233,927 |

Being an increase on nearly 200,000 acres in 1868–69.

1869 the rains set in favourably, and prices fell everywhere, but this was followed by an almost complete drought through July and August, which caused the gravest anxiety to prevail. In September, however, an abundant downpour saved the withering kharif, and a tolerable crop was reaped. But still the distress in Rajputana and the constant drain of supplies in that direction kept prices at an extremely high level, till the rabi crop of 1870 was ripe. The following table shows the course of prices, as far as they are on record, during each period. The average is struck for the six worst districts in the Delhi and Hissar Divisions:—

| Date. | Average Price of Wheat. Seers per Re. |
|---|---|
| 1st June 1868 | 23 |
| 1st January 1869 | 10 1/6 |
| 1st June 1869 | 13 5/6 |
| 1st January 1870 | 8 1/3 |
| 1st June 1870 | 13 1/3 |
| 1st January 1871 | 17 1/6 |

The highest price recorded was a little less than eight seers in Hissar.

2. *Relief Measures.*—Hardly any detailed record has been preserved of the amount of relief given. The number of persons gratuitously relieved for one day was 6,160,045, or 205,335 for one month, or (if we assume that the period during which relief was mainly given was the same as in the North-Western Provinces), 22,815 persons were fed daily for nine months. This relief cost Rs. 4,25,192, of which Government contributed Rs. 1,69,561, besides giving Rs. 142,300 from the remains of the old Famine Fund, and the balance was raised from private subscriptions. The number employed on minor relief works under civil officers was 2,584,990 for one day, or 86,166 for a month, or (on the same hypothesis as before) 7,180 for 12 months continuously. The cost of these works is not stated. At Amritsar 119,331 persons were employed for one day, or 39,777 daily for one month, at a cost of Rs. 12,819. Wages were 1½ annas for adults, 1 anna for children over 10, and ½ anna for those under 10. The system was one of daily wages and no tasks. The average number of cubic feet dug on all relief-works per head daily was 19: at Amritsar it was 10; the number of women and children being very great there, and the earth very hard. One day under constant pressure they did 22 cubic feet.[1] A large number were also employed by the Public Works Department on special or ordinary works; but nothing is on record as to the numbers, or the cost of this form of relief, or the value of their work, or the system on which employment is given.

3. *Remissions of Revenue.*—The remissions of revenue were not very large. The balances due to the famine were about 4½ lakhs in 1868–69, and 2 in 1869–70; of these sums, about three lakhs (Rs. 3,11,469) were classed at the time as irrecoverable, and it seems probable that this amount was remitted.[2] Tacavi advances were largely given for the digging of new wells and tanks, and for the purchase of cattle and seed-grain, amounting in the two years to Rs. 8,31,000.

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[1] Geddes. Admini. Experience, p. 106.

[2] Major Wace thinks that almost all the arrears were ultimately recovered; but a careful examination of the Punjab reports has led me to a different conclusion. The account appears to stand thus:—

| | Rs. | Rs. |
|---|---|---|
| Balance of 1868–69 | — | 4,51,198 |
| Collected in 1869–70 | 1,80,634 | |
| Struck off | 1,48,292 | |
| Total balance carried on to next year | 1,22,272 | |
| New balance of 1869–70 | 2,36,765 | |
| Total balance of 1869–70 | — | 3,59,037 |
| Collected in 1870–71 | 43,360 | |
| Struck off 1870–71 | 2,68,707 | |
| Carried on | 46,970 | |
| New balance of 1870–71 | 1,36,632 | |
| Total Balance of 1870–71 | — | 1,83,602 |
| Collected in 1871–72 | 41,258 | |
| Struck off | 81,283 | |
| Carried on to next year | 61,061 | |

Thus in the three years balances accrued to the extent of Rs. 8,24,595; of these Rs. 2,65,252 were collected, and Rs. 4,98,282 appear to have been struck off, the balance due at the close being Rs. 61,061; of these balances about 2 lakhs were nominal, so that it seems to follow that the other 3 lakhs struck off were remitted on account of the famine.

4. *Loss of Cattle and of Human Lives.*—The loss of cattle was reported to be large, about 88,000, or one-fourth of the cattle of the district having died, it is said in Rohtak, and 300,000 in Hissar and Sirsa. No mention is made in the reports of the time to show what the special famine mortality was considered to be. The mortuary registration gives the following figures:—

| | Deaths recorded. | Ratio per Mille. |
|---|---|---|
| 1867 | 312,708 | 18 |
| 1868 | 267,785 | 15 |
| 1869 | 453,821 | 26 |
| 1870 | 418,926 | 24 |

which shows an increase of 292,254 deaths in the two famine years over the two preceding. As it appears that only half the true mortality was registered in 1867 and 1868, it may be fairly assumed that the excess mortality of the famine period was not less than 600,000.

## Section IV.—The Central Provinces.

[This Section is abstracted from the Replies to the Famine Commission's questions, compiled by Mr. J. G. Nicholls, Assistant Commissioner, under the orders of the Chief Commissioner. That compilation gives a very full account of the season, the condition of different districts, and the reports written from time to time by the Local Officers, but the want, in some districts, of precise statistical information, cannot now be remedied.]

*The Famine Tract.*—The famine of 1868–69 only touched with severity the outskirts of the Central Provinces, but the drought which caused it, and the high prices which followed in its train, were widely felt. The part most severely affected was the northern part of the Saugor, Damoh and Jubbulpore Districts, joining on to Lalitpur in the North-Western Provinces, and to Rewa in Central India, in which, as has already been seen, the famine was acutely felt. In the southern parts of these districts the crops were poor, and there was considerable distress. In the Nerbudda Valley, the Satpura hills, and in the districts bordering on Berar, prices were high, and there was a large number of immigrants from Rajputana, who helped to drain the local resources, but the population of these parts was able to support the strain without any serious difficulty. In the east, however, where rice is the favourite crop, the drought was more disastrous than in the wheat and millet-growing districts, and in parts of Bhandara, Balaghat, Raipur, and Bilaspur, there was very severe distress, almost amounting to famine.

2. *Brief History of the Famine.*—The character of the rainfall was very similar to what has been described elsewhere. It began lightly in June, and then held off again till the middle of July. During August there was hardly any rain at all, and the kharif was nearly lost, when a heavy fall in September saved a good deal of it. In Raipur and the Eastern Districts (where the downfall had been very heavy in July) there was no September rain at all, and this caused the loss of the rice crop. All over the province the winter rains failed, and there was but little dew, so that the rabi crop was very short, except in the Nerbudda Valley, where the retentive black soil enabled the cultivators to reap an average harvest. The first note of distress came from Damoh, where the Deputy Commissioner reported in July that the labouring classes were without employment, and soon the tide of emigration from the more afflicted Native States began to set in southwards. In September, relief-works were opened in Damoh, and in October in Saugor; in November in Balaghat and Bhandara; in January in Jubbulpore; and in February in Raipur and Bilaspur. Poor-houses also were established soon afterwards. The pressure was lightened for a time in March and April on account of the employment given by the harvest; but in May the numbers began to rise again, and the distress increased till the early kharif grains ripened in September. In October all relief was closed, as the rains of 1869 were abundant, and the crop a good one.

3. *Relief Measures.*—Hardly any details are on record as to the system on which relief measures were carried out. In Jubbulpore, and perhaps in some other places, there was besides the opening of a relief camp or relief house, a daily distribution of raw grain (the quantity is not stated) to all applicants who appeared to be in distress and unable to work, the cost of which was defrayed conjointly by Government and by local

subscriptions. An attempt was made to keep out imposters by employing professional beggars, as well as the servants of the chief contributors, to scrutinise the applicants and reject those not really in want. But these checks were not altogether satisfactory, and the news of this charity attracted great crowds of beggars into the town. There were poor-houses also, or relief-camps, established at all important centres of distress for the sick and infirm; the condition of residence was enforced, and cooked food was given to such as would take it, while others received raw grain,[1] but the quantity given is not stated. It is noticed, however, that no caste objections were made to entering these places, even Brahmin women frequenting them in large numbers in the Jubbulpore District.[2] The relief-works under Civil Officers in Jubbulpore were of two kinds,—purely local works, such as cleaning out village tanks and wells; and making new roads and railway feeders; the latter were paid for at contract rates, the "Malguzars" or headmen of the villages taking the contract for the work to be done within his own village, and paying for labour by piece-work wages. It is not said what the average wage earned was; but the contract rates were double the ordinary rates, in order to allow for the necessary inefficiency of unskilled famine labour. Feeble labourers were given light tasks and received daily wages. Elsewhere all the workmen seem to have been paid daily wages. The value of the work done varied greatly; in Raipur the cost was from 5 to 11 annas per hundred cubic feet, including establishment, tools, &c.; in Bilaspur 4 to 6¼ annas. In Saugor the wages given were 1¾ anna to men, 1½ to women, 1¼ or 1 anna to children. In Raipur and Bilaspur a man received 1 anna, a woman 9 pie; in Balaghat a man or woman got 2 annas a day. In several Districts the Public Works Department opened special works to provide employment for the famine-stricken; probably these were carried out under the ordinary system pursued by the Department.

4. *Treatment of immigrants.*—In the three northern districts the number of foreign immigrants was very large, both in the relief-works and in the poor-houses; many came also from the British Districts of the Jhansi Division and Bundelkhand, but the people's own account of themselves could not be trusted, as the immigrants from Native States, supposing they would be refused relief otherwise, often asserted that they came from British territory. Out of 1,500 persons relieved daily (on an average) for thirteen months in Saugor, only one-eighth were residents of the district, and of the rest about three-fifths asserted themselves to come from Native States, two-fifths from Lalitpur, Jhansi, &c. In Jubbulpore, in July 1869, half the paupers in the poor-houses were foreigners. They came from Myhere, Rewa, Panna, Nagode, and other States, and were to a great extent induced to crowd into Jubbulpore by the news of the dole of grain given out there. At last, the numbers having increased to an intolerable extent, an effort was made to get rid of them, and some five hundred were sent back to Myhere by train; but as it was doubtful if proper arrangements were made for their support there, this plan was discontinued; they were then sent by train to a place on the Railway where work was offered them, in the Narsinghpur District, but most of them on arriving there refused to work, and dispersed to beg.

5. *Epidemics.*—When the rains set in, an epidemic of cholera broke out, which was especially severe in the Eastern Districts, and in several cases attacked and dispersed the gangs on relief-works. The cattle, too, suffered from murrain, and besides they were so weak from loss of food that they fell down in great numbers and died, unable to drag themselves through the deep mud to and from their pastures. When the rains were over, a great outbreak of fever followed in the autumn of 1869. But all direct famine had ceased by that time.

6. *Mortality.*—Very little is known about the mortality caused by this famine, but it is believed to have been very severe in the northern parts of Jubbulpore[3] and Saugor. Mortuary registration was then only just beginning to be worked: the population under registration was about 4¾ millions, and in 1868 the death of 77,058, or 16·5 per mile, were recorded. In 1869 the mortality rose to 35·9, and in 1870 it was about 25 per mille. In these two years an excess mortality of 130,000 above that of two such years as 1868 was registered. And as only about half the true number of deaths can have been registered in 1868, and it is probable that the record of 1869 and 1870 was equally defective, it may be reasonably concluded that the real excess mortality of these two years was not less than 250,000.

[1] But in Saugor the inmates received money,—an adult 4 pice, a child from 3 to 1 pice, according to age. Page 21.

[2] Page 22.

[3] A special census was taken in part of the Marwara Tahsil of Jubbulpore after the famine, but its results have been lost.

7. *Cost of the famine to Government.*—The total cost to Government of the relief measures taken during the famine is thus stated:—

| | Rs. |
|---|---|
| Cost of relief-works and poor-houses under Civil Officers | 3,39,365 |
| Cost of relief-works under Public Works Department | 4,89,255 |
| Takavi advances for wells, seed-grain, and plough-cattle | 2,29,746 |
| Remissions of revenue in two districts | 471 |
| | 10,58,847 |
| Deduct charitable contribution | 64,432 |
| Balance paid by Government | 9,94,415 |

The following tables show all that it has been possible to ascertain concerning the number of persons relieved in the poor-houses or on the relief-works in the different districts; but the necessary statistics have not been reported in a few cases:—

STATEMENT showing DAILY AVERAGES on RELIEF WORKS.

| Districts. | 1868. | | | 1869. | | | | | | | | | | Total No. | Average Daily No. for 12 months. | Cost. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | October. | November. | December. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | | | |
| | | | | | | | | | | | | | | | | Rs. |
| Jubbulpore | — | — | — | — | 1,018 | 964 | 1,423 | 2,861 | 5,765 | 622 | — | — | — | 12,653 | — | 18,495 |
| Damoh | 1,158 | 1,158 | 1,158 | 1,158 | 1,158 | 1,158 | — | — | — | — | — | — | — | 6,948 | — | 16,540 |
| Saugor | 229 | 118 | 92 | 147 | 254 | 385 | 25 | 106 | 125 | 1,055 | 174 | 46 | 18 | 2,774 | — | 12,216 |
| Balaghat | — | — | — | — | — | — | 424 | 860 | 892 | — | — | — | — | 2,176 | — | 7,372 |
| Bhandura | — | — | — | — | — | — | 147 | 154 | 167 | — | — | — | — | 468 | — | 1,199 |
| Chanda | 484 | 514 | 48 | 366 | 356 | 207 | 363 | 656 | 695 | 82 | 37 | 75 | — | 3,883 | — | 17,032 |
| Chhindwara | — | — | — | 73 | 138 | 295 | 294 | 297 | 245 | — | — | — | — | 1,342 | — | 3,864 |
| Bilaspur | — | — | 35 | 16 | 1,433 | 3,824 | 2,780 | 1,200 | 237 | 431 | 283 | 94 | 79 | 10,412 | — | 19,367 |
| Raipur | — | — | 1,520 | 1,140 | 2,999 | 5,394 | 4,760 | 2,702 | 394 | 853 | 3,591 | 3,335 | 1,825 | 28,513 | — | 69,336 |
| | 1,871 | 1,790 | 3,286 | 2,900 | 7,356 | 12,227 | 10,216 | 8,836 | 8,395 | 1,988 | 3,911 | 3,504 | 1,904 | 69,169 | 5,765 | incomplete |

These figures are incomplete from want of the Damoh figures, and in Saugor very much was done, as elsewhere, by the P.W.D. Everywhere Municipal and Local Fund Committees were carrying out, as far as they could, petty relief-works. Balaghat Local Fund Committee spent very large sums before April. Seoni was worse off than Chanda.

## Statement showing Daily Averages relieved at Poor-houses.

| Districts. | 1868. | | | 1869. | | | | | | | | | | | | Total No. | Average Daily No. for 12 months. | Cost | — |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | October. | November. | December. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | | | | |
| Jubbulpore | — | — | — | | 2,860 | 4,194 | 4,221 | 4,028 | 4,596 | — | — | — | — | 20 | — | — | — | — | Returns incomplete for months after June to November. |
| Out poor-houses charitable out-relief | — | Estimated | | | — | 1,000 | 1,350 | 1,100 | 1,150 | 1,200 | 600 | 200 | — | — | — | — | — | — | |
| Sudden vagrant and sick camp | — | Do. | | | — | — | — | — | — | 300 | 500 | 400 | 250 | 40 | — | — | — | — | |
| Patan, &c. | — | Do. | | | — | — | — | — | — | — | 60 | 150 | 60 | — | — | — | — | — | |
| Total for Jubbulpore | — | — | — | — | 2,860 | 5,194 | 5,271 | 5,128 | 5,746 | 1,500 | 1,160 | 750 | 310 | 60 | — | 27,979 | — | *25,972 | *Cost to end of June. |
| Damoh | 21 | 35 | 36 | 33 | 38 | 41 | 54 | 100 | 356 | 887 | 544 | 1,208 | 663 | 120 | 36 | 4,172 | — | 2,949 | |
| Saugor | — | — | 1,038 | 331 | 1,765 | 1,425 | 1,695 | 1,751 | 1,897 | 3,207 | 2,284 | 2,028 | 887 | 27 | 65 | 18,400 | — | 39,165 | |
| Balaghat | — | — | — | — | — | 5 | 27 | 28 | 29 | — | — | — | — | — | — | 89 | — | 256 | |
| Bhandara | — | — | — | — | — | — | — | 143 | 336 | 264 | 137 | — | — | — | — | 1,189 | — | 1,357 | |
| „ Gamindars | — | — | — | — | — | — | — | — | 112 | 150 | 47 | — | — | — | — | | | | |
| Bilaspur | ... | — | — | — | — | 104 | 167 | 92 | 240 | 219 | 320 | 493 | 428 | — | — | 2,063 | — | 3,182 | |
| Raipur | — | — | — | — | 15 | 51 | 55 | 453 | 447 | 629 | 523 | 775 | 780 | — | — | 3,728 | — | 7,908 | |
| Probable additions for Damoh and Jubbulpore | — | — | — | — | — | — | — | — | — | 6,500 | 5,500 | 3,500 | 1,000 | — | — | 16,500 | - | — | |
| | 21 | 35 | 1,074 | 364 | 4,678 | 6,820 | 7,269 | 7,695 | 9,163 | 6,856 | 4,471 | 3,986 | 3,405 | 87 | 65 | 74,120 | 6,177 | 80,816 | |

There was similar relief in Leoni; Returns not available. *See* my Report, page 45.

## Section V.--Bombay.

[Abstracted from the Administration Reports of the Bombay Presidency for 1868-69 and 1869-70.]

*The monsoon of* 1868 *and its effects.*—The irregularity and weakness of the south monsoon of 1868 was felt also in the Bombay Presidency. The whole of the Deccan, and especially the Districts of Poona, Ahmednagar, and Khandesh suffered from drought: in Khandesh only 16 inches of rain fell during the year (the average being 25 inches), and a hot wind blew in the intervals of rain which dried the soil and burnt up the crops. In Ahmedabad, Kaira, and the Panch Mehals, the rains of June and July were slight, but were followed by extraordinary floods in August, which swept away the standing crops and did immense injury to the towns of Ahmedabad and Kaira. The consequence was extreme local distress in those cities, and a widespread but not acute scarcity and dearness of food. To this was added the immigration of the starving people of Marwar, who came in great numbers into Khandesh, Guzerat, and the Tharr and Parkar District of Sindh. The rainy season of 1869-70 was, however, very favourable, the only drawback being a plague of locusts in Guzerat; and all trouble would have been over then except for the immigrants who still had to be provided for till prosperity returned to their own country.

2. *Relief works carried out.*—The notices regarding the relief measures are not as full as could be desired. Special relief works were opened, and the ordinary public works of the year were enlarged to admit of giving more employment to the distressed population. In Ahmednagar three roads were undertaken at a cost of Rs. 43,964,[1] employing 5,100 persons. In Khandesh an important road (from Chalisgaon to Kanhar) was opened, involving an expensive crossing over a range of hills, the estimate for which was about 4½ lacs; on this Rs. 56,194 was expended in 1868-69, and Rs. 3,26,128 in 1869-70, besides Rs. 1,14,017 on other minor relief works.[2] Rs. 1,12,700 were spent in Ahmedabad and Kaira on the restoration of tanks and wells ruined by the floods. In the Districts of Ahmedabad and Tharr and Parkar the immigrant Marwaris were largely employed on the ordinary current works, and a special piece of road was opened for them, costing Rs. 5,470.[3] It has been stated[4] that in this latter district Rs. 1,14,785 were expended on the relief of the immigrants, but the authority for the figures has not been traced.

*Gratuitous relief given.*—Besides these relief works, Government gave sundry grants towards gratuitous relief. To the towns people of Ahmedabad and Kaira[5] Rs. 30,000 were given in 1868-69 to help them to rebuild their houses. In 1869-70 a grant of Rs. 15,000[6] was made to the Collector of Ahmedabad for the purchase of grain to feed the starving immigrants, and Rs. 3,000 were bestowed on the people of Dhulia in Khandesh. Subscriptions to the amount of Rs. 46,500 were collected[7] in Bombay and Poona, and sent, with the balance of the Famine Fund of 1864, Rs. 29,300, to the different Collectors for distribution to the sick and infirm sufferers from famine. Most of this money was spent in Ahmedabad.

4. *Cost of the relief measures.*—As far then as these records go, the cost of the scarcity of 1868-70 in the Bombay Presidency may be set down as follows:

| | Government. | Public. | Total. |
|---|---|---|---|
| | Rs. | Rs. | Rs. |
| Relief works - - - | 5,44,456 | — | 5,44,456 |
| Gratuitous relief - - | 48,000 | 46,500 | 94,500 |
| Total - - - | 5,92,456 | 46,500 | 6,38,956 |

No revenue seems to have been remitted.

[1] Administration Report, 1868-69, p. 197.
[2] *Ib.*, 1869-70, p. 94. (The figures in pp. 214-15 do not quite agree.)
[3] *Ib.*, 1868-69, p. 198-99.
[4] Dr. Moore's Reply to Famine Commission.
[5] Report, 1868-69, p. 65.
[6] *Ib.*, 1869-70, p. 94.
[7] *Ib.*, 1868-69, p. 65.

# FAMINE OF 1873–74.

## SECTION I.—BENGAL AND BEHAR.

[MATERIALS.—The three official volumes called "Correspondence relating to the Famine in Bengal "and Behar, 1873–74, Vols. I. and II.," and "Special narratives of the drought in Bengal and Behar, "with minutes by Sir R. Temple" (Calcutta, 1874), (quoted in the margin as B. B. I., II.,or III.) Vol. II. contains Sir. R. Temple's minute of 31st October 1874, giving a résumé of the events of the famine, which where quoted is referred to specially as "T." Also Mr. A. P. MacDonnell's report on "Food-grain supply, and famine relief in Behar and Bengal."]

### PREFACE.

The history of this famine has been written with greater fullness than in any previous case, for two reasons. First, there has been no other famine in which so much pains has been taken to estimate and forecast the degree and the results of the calamity, or so high an ideal held up of the object to be aimed at, or so careful and complete preparations made for achieving that object. Second, the principles adopted by the administrators of relief measures were in many respects different from those which have been worked on before or since; the theory that State relief should not be made too attractive to the recipient, and that tests should be employed to prove the worthiness of the applicant, became gradually more and more discredited, being superseded by the principle that relief should be administered on the basis of the personal acquaintance of the relieving officer with the circumstances of the applicant. It seems, therefore, important that special pains should be taken to trace the progress of the successive steps by which these principles came to be accepted, and the results which their acceptance brought about.

### CAUSES OF THE FAMINE.

1. *Season of* 1873.—The crops of the years 1871 and 1872 had been fair average ones, and prices in the early part of 1873 stood at about their ordinary figure. The famine of 1873–74 was due entirely to the failure of the rains of 1873, and chiefly to their deficiency during the three latter rainy months. The season is thus described by Sir R. Temple[1]—

"The rain did not begin till late, that is in July, and even then was scanty. It lasted more or less, but never abundantly, till the end of August, when it for the most part ceased prematurely. Enough had, however, fallen to secure a fair yield of the crops that are reaped in August and September. Little or none fell during the months of September and October and November, that is, during the whole autumnal season, when heavy showers are indispensable for insuring the maturity of the rice crop of December (the most important of all the crops), and for sowing the crops which are to be reaped in the following spring. As experience showed that the consequences of drought are sometimes averted by rain even at the last moment, hope was not abandoned till the end of October. Not till then could it be seen whether the apprehension of failure of the crops would be realised or not. By that time, however, it became certain that widespread and heavy loss must occur in the December crop; that the sowing of the spring crop must be short, and that the germinating and growing of what had been sown must be jeopardised. The injury of the December rice harvest was almost irreparable. The injury to the young spring crops might yet be repaired, if rain should fall between the end of December and the beginning of February. Fear was chiefly felt for Behar and for the North part of Bengal, but largely also for all the rest of Bengal, save the eastern part in the basin of the Brahmapootra, and the deltaic region in the south which depends on inundation rather than on rainfall. On the other hand, it had been ascertained that the September rice crop of Bengal and the August maize and coarser grains of Béhar had produced an average yield, sufficient to sustain the people till at least the middle of winter."

2. *Rainfall Statistics.*—The following statement gives the rainfall month by month in each of the districts which suffered from drought. The figures for 1873, as compared with the average, show that the quantity gauged in July was in most cases (except the four North-Eastern Districts), considerably larger than usual, and in August it was quite sufficient; but in September it was only a third of the average, and in October it was entirely wanting, these being the most important months in the year for the great winter rice-crop.

[1] B. B. II., 67, 68 (T.)

RAINFALL of 1873 compared with that of an AVERAGE YEAR.

| | | June. | July. | August. | September. | October. | November. | Total. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|
| Shahabad | 1873 | 1·24 | 17·29 | 9·25 | 2·48 | — | — | 40·21 | The figures for 1873 are taken from Mr. MacDonnell's book, the averages from the Meteorological Report for 1877. It is worthy of remark that the averages in Mr. Mac Donnell's book are in every case higher than these. If the facts as to the ordinary amount of rainfall had been as well known then as they are now, the deficiency of September and October would not have been thought so great. |
| | Average | 7·01 | 12·88 | 9·63 | 9·18 | 2·65 | 0·18 | 41·53 | |
| Sarun | 1873 | 4·11 | 15·94 | 9·57 | 1·12 | — | — | 30·74 | |
| | Average | 6·15 | 9·49 | 8·54 | 6·81 | 2·65 | 0·02 | 33·66 | |
| Darbhanga | 1873 | 4·36 | 8·62 | 7·23 | 3·87 | — | — | 24·08 | |
| | Average | 6·65 | 13·66 | 9·81 | 10·45 | 2·71 | — | 43·29 | |
| Muzaffarpur | 1873 | 6·16 | 12·20 | 9·17 | 2·52 | — | — | 30·05 | |
| | Average | 6·18 | 10·57 | 9·27 | 8·65 | 3·45 | 0·02 | 38·14 | |
| Champáran | 1873 | 9·04 | 11·57 | 10·32 | 0·51 | — | — | 31·44 | |
| | Average | 8·30 | 10·41 | 10·66 | 8·04 | 3·26 | — | 40·67 | |
| Gya | 1873 | 1·39 | 12·74 | 9·13 | 2·69 | — | 0·13 | 26·08 | |
| | Average | 6·22 | 11·64 | 9·68 | 7·21 | 2·85 | — | 37·60 | |
| Monghyr | 1873 | 2·94 | 16·01 | 13·83 | 3·73 | — | 0·06 | 36·57 | |
| | Average | 6·20 | 11·33 | 10·50 | 7·92 | 3·60 | 0·04 | 39·59 | |
| Bhagalpur | 1873 | 5·05 | 9·32 | 9·62 | 4·06 | 0·23 | 0·06 | 28·34 | |
| | Average | 8·12 | 11·34 | 10·66 | 7·77 | 4·66 | 0·03 | 42·58 | |
| Purnea | 1873 | 6·97 | 17·05 | 9·39 | 5·14 | — | — | 38·55 | |
| | Average | 10·95 | 15·31 | 12·69 | 11·60 | 3·51 | — | 54·06 | |
| Sónthal Pergunnahs | 1873 | 4·05 | 16·72 | 9·43 | 7·17 | 0·02 | 0·06 | 37·45 | |
| | Average | 8·53 | 12·87 | 12·35 | 7·11 | 3·43 | 0·23 | 44·52 | |
| Dinájpur | 1873 | 18·27 | 8·24 | 12·62 | 1·62 | — | — | 40·75 | |
| | Average | 17·92 | 15·92 | 12·71 | 12·86 | 6·10 | 0·13 | 65·64 | |
| Rangpur | 1873 | 12·91 | 5·88 | 13·23 | 4·90 | 0·16 | — | 37·08 | |
| | Average | 21·02 | 17·10 | 12·70 | 11·43 | 5·30 | 0·24 | 67·79 | |
| Bogra | 1873 | 6·74 | 7·95 | 12·83 | 3·29 | — | — | 30·81 | |
| | Average | 15·77 | 18·25 | 11·75 | 13·87 | 5·11 | 1·04 | 65·79 | |
| Rajshahai | 1873 | 7·34 | 7·89 | 12·43 | 4·60 | 0·23 | 0·21 | 32·70 | |
| | Average | 10·60 | 12·27 | 11·15 | 10·92 | 5·09 | 0·23 | 50·26 | |
| Monthly Total | 1873 | 90·57 | 167·42 | 148·05 | 47·65 | 0·64 | ·52 | 454·85 | |
| | Average | 139·62 | 183·04 | 152·10 | 133·83 | 54·37 | 2·16 | 665·12 | |
| Percentage or of excess deficiency of 1873, compared with average | | −35 | −8·5 | −2·6 | −64 | −98·8 | −76 | −31·6 | |

3. *Effects of the drought.*—This early cessation of the rain was enough to justify the prediction that the winter rice crop must be extremely poor and in some parts would be almost totally lost. It remained to ascertain what the effect of that loss would be. It was here that the great difficulty was met which the Bengal Government had to face, and to conquer as best it could. Never having had a field survey (except in scattered localties) and not being brought into direct communication with the cultivating population by means of periodical settlements, as is the case in the rest of India, their officers had no positive information as to the area generally placed under any particular crop, or the ordinary out-turn of a crop, and could only make estimates more or less hazardous, as to what proportion the winter rice crop bore to the annual agricultural produce and what practical effect on the food of the people would be produced by the loss of a large portion of that crop.

## ESTIMATES OF THE AREA OF DISTRESS, THE EXTENT OF THE LOSS OF CROPS, AND THE NUMBER LIKELY TO NEED RELIEF.

4. *Estimate of October.*—The first estimate of the degree of the loss sustained was made by the Commissioner of Patna, Mr. (now Sir) S. C. Bayley, on October 29th.[1] He reported that the bhadoi or early kharif crop was nowhere first-rate; in some districts it was destroyed by floods; and the winter rice crop would not amount to half an average crop anywhere, while in some parts it would only be an eighth of an average; that unless rain falls in the next 20 days, the rabi crop must be a failure except in Patna;

[1] B. B. I., 14, 15.

that stocks vary everywhere, but that no one considered there was a six months' supply in hand. He estimated the proportion of land under each crop to be as follows :—

TABLE showing the PROPORTION in which the THREE CROPS (BHADOI, KHARIF, and RABI), are generally believed to grow in the several districts of the Division.

| District. | Proportion of Land under each Crop, out of 16 Annas of the Lands of the District. | | | REMARKS. |
|---|---|---|---|---|
| | Bhadoi. | Kharif. | Rabi. | |
| 1. | 2. | 3. | 4. | |
| | As. | As. | As. | |
| Patna - - - - | 2 | 8 | 6 | Bhadoi lands are also grown with rabi after the bhadoi crops are reaped, so that, strictly speaking, the total rabi lands are made up of columns 2 and 4. |
| Shahabad - - - | 2 | 6 | 8 | |
| Gya - - - - | 2 | 12 | 2 | |
| Tirhut - - - | 4 | 10 | 2 | |
| Saran - - - - | 4 | 8 | 4 | |
| Champáran - - - | 6 | 6(? 8) | 2 | |

5. *Estimate of November.*[1]—In the special narrative for the 21st November, the following estimate is given for the crops of the whole year :—

| | | | Or assuming the cultivated area to vary with the population. |
|---|---|---|---|
| Littoral Districts of Orissa and Bengal, and Sylhet - | 13 millions | Full average crop - - | 208 actual against 208 average. |
| Eastern, Central, and Western Bengal and Assam - - | 26½ „ | A half to three quarters - | 265 „ „ 424 „ |
| Northern Bengal and Behar | 26 „ | A quarter to a third - - | 130 „ „ 416 „ |
| Total - - | 603 „ | „ | 1,048 „ |

Or about three-fifths of an ordinary harvest.

6. *Comparison with* 1865.—On the 25th November, Sir G. Campbell,[2] drew up a note to compare the drought of 1873 with those of 1865 and 1769. His conclusion was that we know too little about 1769–70 to make a comparison; that the drought of 1865 (Orissa being put aside), though more general, had not been so intense, especially in Behar, as that of 1873; but that 1865 was preceded by a bad year, which was not the case now, so that the two calamities, all things considered, were almost equal. The year 1865, however, had good winter rain and a fair rabi crop; all depended now on what kind of winter rains would fall and what the rabi crop of 1874 would be. On the 5th December,[3] the Government of India writing to the Secretary of State accepted this view—

"We incline to the view that the extent and character of the distress in Behar and parts of Bengal will much depend on the winter rains. If they shall be propitious, the spring crops in Behar and Bengal will not be so deficient as we now fear that they may be. There will be good supplies of food obtainable from the North-Western Provinces. If these rains shall fail, then the spring harvest in Behar must be extremely deficient, and the surplus food obtainable from the North-Western Provinces would be much less than what we now hope for."

7. *Estimate of the British Indian Association.*—On the 21st November, the British Indian Association submitted[4] a most gloomy memorial estimating the outturn of the winter rice crop of all Bengal (Orissa excepted) at only ⅜ of an average one, and arguing against reliance on the existence of any food-crops in the country. They urged on Government the duty of prohibiting exports of rice, except from Burmah, and of making large importations of food; adding that the "task of feeding sixty millions of people might well appal the stoutest heart." They were asked to explain the grounds on which they took so much worse a view of the loss of the rice crop, and on which they spoke of Government having to feed sixty millions of people, that is the whole population, whereas it was shown[5] that in the North-Western Provinces famine of 1868–69 the largest number

[1] B. B. III. 9, 10. [2] *Ib.* I., 58, 59. [3] *Ib.* I. 85. [4] *Ib.* I. 72. [5] *Ib.* I. 80.

Government ever had to relieve was 13 per cent. of the population for a short time and 3·9 per cent. for a continuance, and that only in one exceptional district.

8. *Revised Estimate of the Association.*—On the 24th December,[1] the Association sent up an elaborate reply to those questions. They asserted that food-stocks were never very large, because it could not pay to keep so perishable a crop as rice in store, and that at most there could not be more than three months grain retained, over and above the usual inter-harvest consumption. Much reliance therefore could not be placed on these. The winter rice crop they estimated as occupying $\frac{12}{16}$ of the cultivated area in Bengal; and this would yield less than half the usual supply. The rabi could not be calculated on as more than half an average crop. They reckoned the stocks of old rice, plus the probable out-turn of the winter rice, at only sufficient to feed the whole population for six months, and taking the ensuing spring and autumn crops as sufficient for two months more, there would be no food for four months in the year. Reduction of consumption would no doubt assist, and if everybody agreed to live on $\frac{2}{3}$rds of his usual food, an eight months supply would carry the country over the year; but as a matter of fact such economy is never practised till high prices make it unavoidable. On the whole, they concluded that Government ought to prepare for pouring in grain into the country "sufficient for at any rate a three months' supply." This, as observed by Sir R. Temple (II., 69), implied the importation of 3,750,000 tons of food—an impossible estimate. The Lieutenant-Governor (January 8th) remarked on this[2] that the Association's estimate agreed fairly with his, that (looking at the three harvests of the year together) only half the average out-turn would be produced. No doubt a half crop would be sufficient to feed the whole province, if they practised economy, and if it could be equally distributed, but it was this very matter of distribution which was the main difficulty to be overcome. On the 6th January the Lieutenant-Governor reported[3] that the failure of the rice crop was ascertained to be quite as heavy as had been anticipated; the rabi crop was doing well, but its area was unusually small; and even in ordinary years, he considered (though no statistics on the subject existed) that the best opinion was that the spring crops furnished only a sixth of the food of the people in Bengal, and a third in Behar.

9. *Estimate of the Government of India in March.*—On the 20th March, in a despatch[4] recapitulating the policy adopted by the Government for the relief of famine, the Viceroy wrote as follows:—

"The absence of any trustworthy statistics as to the area under cultivation in each district and the out-turn of each crop has throughout rendered it a matter of extreme difficulty for us to estimate the extent of the danger with which we have to cope. Even at this late period, although the utmost attention has been given to the subject, our estimates ere necessarily somewhat conjectural, but in order to be upon the safe side, we have always accepted the highest estimate which has been made by any responsible authority.

"The tract of country in which distress will be more or less aggravated comprises portions of the Patna, Bhagulpore, and Rajshahye Divisions. The population of the whole of these Divisions amounts to about 25 millions. The rough estimate formed by us last November of the number of persons who, judging from the experience of former times, would be likely to come upon the hands of Government, was about 2½ millions, or 10 per cent of the whole population, for a period of seven months. We are now able to form a more detailed estimate of our wants."

This estimate was that the area of severe distress was confined to a tract of country having a population of 15 millions, and of these Government might have to provide food, at the worst period, for about 18 per cent., or 2,663,000 people; the allotment made was 327,500 tons. In the remaining districts with 10 millions population, no detailed calculations had been framed, but it was expected that few people in comparison would have to be fed; and only 60,000 tons had been allotted for their provision.

10. *Latest Conclusions as to the loss of Crop. Mr. MacDonnell's Estimates.*—It is interesting, after stating these calculations, to compare them with the results arrived at by a careful enquiry specially conducted by Mr. A. P. MacDonnell after the famine was over. These too are only estimates, but they are prepared by a specially competent officer with leisure at his command and every opportunity of obtaining the best information: they are mainly based on actual facts ascertained in small areas: and they are probably the best approximation that can be obtained to the real facts so long as Bengal shall be deprived of the benefits of a cadastral survey. The following table shows his estimates as to the out-turn of average years and of 1873–74 for the

[1] B. B. I, 124. [2] *Ib.* I. 138. [3] *Ib.* I. 149. [4] *Ib.* I. 315.

three principal crops of the year, and the ordinary amount of food consumed by the people :—

| Districts. | | Per-centage of cultivated Area under | | Out-turn in Tons. | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Winter Rice. | Other Crops. | Winter Rice. | Bhadoi. | Rabi. | Subsidiary Crop. | Total. | Consumption at 7 maunds per head. |
| Shahabad | Average | 54 | 46 | 343,000 | 68,000 | 207,000 | 15,000 | 633,000 | 422,000 |
| | 1873–74 | — | — | 43,000 | 17,000 | 207,000 | 15,000 | 282,000 | — |
| Saran | Average | 28 | 72 | 150,000 | 230,000 | 156,000 | 32,000 | 568,000 | 504,000 |
| | 1873–74 | — | — | 15,000 | 153,000 | 70,000 | 21,000 | 259,000 | — |
| Darbhanga | Average | 57 | 43 | 476,000 | 238,000 | 168,000 | — | 882,000 | 544,000 |
| | 1873–74 | — | — | 77,000 | 119,000 | 105,000 | — | 301,000 | — |
| Muzaffarpur | Average | 53 | 47 | 448,000 | 162,000 | 120,000 | 25,000 | 755,000 | 536,000 |
| | 1873–74 | — | — | 112,000 | 148,000 | 103,000 | 25,000 | 388,000 | — |
| Champáran | Average | 40 | 60 | 247,000 | 151,000 | 119,000 | — | 517,000 | 352,000 |
| | 1873–74 | — | — | 31,000 | 94,000 | 60,000 | — | 185,000 | — |
| Gya | Average | 54 | 46 | 360,000 | 85,000 | 184,000 | 11,000 | 640,000 | 476,000 |
| | 1873–74 | — | — | 180,000 | 50,000 | 184,000 | 11,000 | 425,000 | — |
| Total | Average | 47 | 53 | 2,024,000 | 934,000 | 954,000 | 83,000 | 3,995,000 | 2,834,000 |
| | 1873–74 | — | — | 458,000 | 581,000 | 729,000 | 72,000 | 1,840,000 | — |

11. *Criticism of those Estimates.*—With regard to these figures it must be admitted that they seem more likely to err on the side of excess than of deficiency in their estimate of the loss incurred. This is especially so in the case of the bhadoi crop, which depends on the rains of June, July, and August, and which was held to have been largely injured by excessive rainfall in July, although it seems doubtful if in several cases the rain was really excessive. Thus in Champáran the rains were excellent, yet the crop is put at five-eighths; in Darbhanga they were only a little below the average, yet the district is credited with the loss of half its bhadoi crop; in Bhagalpur and Purneah the rainfall indicates only slight irregularity, yet the out-turn is estimated at five-eighths and a half respectively of the average. The winter rice must obviously have suffered severely from the deficiency of the rain in September and October, and yet even here, while some districts received only from ½ to 1½ inches, Darbhanga got 3·8 inches and its loss is estimated at five-sixths of the crop. Bhagalpur got four inches, Purneah five, and are supposed to have lost eleven-twelfths and thirteen-sixteenths respectively; Dinajpur with 1·6 inches saved one-fourth, and Rangpur with five inches saved only a fifth of its crop. Lastly, the rabi, which in all the reports is spoken of as excellent, and in some as unusually good, seems to be valued too low by an estimate which puts its out-turn at three fourths of the average.

12. *Conclusion to be drawn from those Estimates.*—Such criticisms as these, based mainly on the rain registers, would have little weight in other provinces, if opposed to the careful contemporary estimates of men accustomed to deal with Agricultural Statistics and having some definite knowledge of area and outturn: in Bengal, where the requisite knowledge and training are deficient, they may be to some extent worth consideration. Still, if it is assumed that Mr. MacDonnell's are the best approximation to the truth that we are likely to obtain, they indicate a state of considerable prosperity in ordinary years (the out-turn of food being largely in excess of a very full rate of consumption), and they do not indicate that even so extensive a loss of one year's crops (if preceded and followed by good harvests) need necessarily produce severe suffering. According to this estimate, it appears that the great winter rice-crop supplies about half the food produce of the year: that the out-turn of that crop was very little more than a fifth of the average: that the autumn or bhadoi crop was not quite two-thirds of an average: that the rabi was about three-fourths of an average: and that, taken altogether, the food crop of the year, was short by a million tons of the food consumption of an ordinary year. If however the people taking alarm in time should reduce their consumption to the minimum point (say from 7 to 4½ maunds a year or from 1½ to 1 lb. a day) the food crop, even of this year of drought, would be almost sufficient for them, within 100,000 tons, and for that quantity and the seed-grain required for next year reliance might

probably be placed on the reserved stocks of the country which at the lowest estimate must have been equal to more than a two-months' consumption.

13. *Comparison of Estimates with latest Conclusions.*—It is instructive to compare these figures with those of the previous estimates, and to observe how important an influence on the administrative measures was exercised by the statistical ignorance of the people and the officers. Mr. S. C. Bayley estimated that half of Saran and three-fourths of Gya were under winter rice, whereas the true figures were approximately a quarter and a half: consequently the loss of that crop did far less harm than he was bound to anticipate. The Association which represented the landowners of the country was lost in the deepest ignorance; they believed that the spring and autumn crops produced only two months' food for the country, whereas they really produce, on an average, two-thirds of the food, or eight months' consumption. The only correct estimate was that made by Sir G. Campbell, that the spring-crop produced a third of the food supply in Behar; but this aperçu, and the corollary drawn from it that, if the rabi crop should turn out well, the danger of famine would to a great extent pass away, were forgotten or thrust aside in the growing panic and the determination to "avert the "calamitous effects of the drought."

## Brief History of the Famine.

14. *Earliest Objective of the Local Government.*—On the 22nd October, the Lieutenant-Governor, Sir G. Campbell, sent his first letter of warning to the Government of India:[1] in Behar and North Bengal the rains, late in coming, had been so heavy as to do great injury to the bhadoi crop, and they had stopped so prematurely that the winter rice was almost all lost, and there was great fear that the ground would be too dry to admit of the rabi being sown. In East and Central Bengal the crops would be poor, but not extremely so: in Orissa alone they were good. He asked that he might receive authority, (1) to commence relief-works at once, (2), to make such importations as are "possible and not likely to be affected by private enterprise," and (3) that exportation of rice from India to foreign countries might be stopped. With regard to the management of relief-works, Sir G. Campbell's[2] view was that—

"to render effectual aid to the people, it is of all things most necessary that work should be offered in good time, so that the existence of public works may be known to the people at large, and those who stand in need of work may find their way to the work and be suitably provided for, before the greatest stress comes. All experience shows that work is wanted to avert starvation rather than to save people already half-starved and unfit for work, and that it takes time to draw to public works people who are not accustomed to labour for hire. In this view, in case of reasonable apprehension of scarcity, we can hardly begin too soon. * * * * There can be no surer test of the state of the country—no barometer, as it were, by which the condition of the people can be better gauged—than the degree to which they seek employment on public works. As such works are found more and more to attract classes usually self-supporting, so we may judge that there is a want in the country; that is, provided that this test is established in sufficient time."

15. *Principles of Relief, prescribed by Supreme Government.*—On the 7th November the Government of India published a resolution[3] setting forth the principles on which it was proposed to administer measures of relief to the distressed. The request for the prohibition of exportation was disallowed, but on the other two points the desired authority was given, and certain large works were mentioned—the Soane Canal, the Gandak embankment, and the Northern Bengal State Railway—as suitable works for the employment of famine labour.

Grain was to be purchased only for the food of the labourers engaged on these works; it was not meant to "undertake the general purchase and distribution of grain throughout "large tracts of country, or to regulate in any manner the prices of it in the market." The justification of the principle adopted was thus stated:—

Para. 13. "Considerable bodies of men will be congregated on or near the works at a distance from their homes, and often in localities remote from the established markets. It will be necessary, therefore, that sufficient supplies of food be collected for their sustenance. If the accumulation of such supplies be left to the ordinary course of commerce, special pressure will be put on the grain-trade in certain localities at the very time when all its resources are being taxed for the general supply of the province or district. And if the wages were to be paid in case to so large an aggregate of labourers, an extraordinary rise of prices would be created by the action of Government, thereby aggravating the crisis in districts already placed in critical circumstances, and so far counteracting the benefit which the works were intended to secure, namely, the mitigation of the effect of the scarcity.

"Now in regard to these public works carried on under the orders either of the Supreme Government or of the local Government, the State will be in the position of an employer of labour on an unusually large scale, and is justified in doing that which all other employers do, namely, selecting the mode of

[1] B. B. I. 2. [2] *Ib.* I. 5. [3] *Ib.* I, 19.

remunerating its workpeople most acceptable to them and most suitable to the surrounding circumstances. Such mode of remuneration will generally be payment in kind, that is, in food-grain. For this particular purpose, then, sufficient supplies of grain will be purchased and laid in both by the Government of India and by the local Government for the public works under their charge respectively. These supplies will be obtained in such a manner as to interfere as little as possible with the trade in grain and with the supplies of food ordinarily available for consumption in the neighbourhood of the works, or within the area of the distressed districts." * * * *

Advances also were to be given to landlords or tenants for public improvements, and at sowing time for seed-grain, and to non-official gentlemen, zemindars, planters, traders, &c., who would undertake the provision and distribution of grain in localities where from the difficulties of transport, the absence of traders or other local circumstances, food cannot during the period of scarcity be obtained by the people. The railways were directed to lower their rate of freight on food grains by half, fixing it at $\frac{1}{8}$ of a pie per maund ($\frac{7}{2}$ of a penny, or a little more than a farthing per ton) per mile, compensation being paid them for the difference. Emigration was to be encouraged to the tea districts of Assam and to British Burmah. Should the distress become severe, a Central Relief Committee would be formed in Calcutta and Local Relief Committees in the districts, to be assisted by Government. The committees should organise a system of relief for those who may be threatened with death or disease for want of food, by the distribution to them of cash, grain, or cooked food, according to circumstances. Information should be published periodically and at short intervals regarding the state and prospects of the crops, the stock of food, the public works in progress, the relief operations, and other circumstances relating to the scarcity.

16. *Earliest instructions as to Relief Measures.*—On the 17th November the Lieutenant-Governor issued a circular[1] of instructions to his officers. He defined the famine tract as consisting of—

(1.) All seven districts of the Patna Division.
(2.) All districts of the Bhagalpur Division except the Santhal country.
(3.) The districts of Dinajpur, Rangpur and Bogra, and part of Rajshahai, Malda and Murshidabad, in the Rajshahai Division.

In this area it was anticipated that the total outturn of food in the year would be only $\frac{3}{8}$ of an average crop, unless copious rain should fall at an early date; in other parts of Central Bengal the outturn was expected to be half the average. He then recapitulated the main heads of relief measures laid down by the Government of India; dividing them into five classes. The first contained the principles about private trade and advances to assist importation. The second was relief-works. Besides the large schemes already mentioned, relief works were to be commenced wherever required, paying the ordinary wages of the country; earthwork on roads was mentioned as the most suitable kind of work. Third, with regard to laying in supplies of grain to pay the labourers with on these works, the rules laid down were—"(1) that Government officers must, as far "as possible, operate through the trade; (2) that they must get grain from a distance; "(3) that they must only store grain where the local supply cannot be depended on "to suffice for the wants of the labourers." But these are to be paid in cash as long as food is cheap: when prices "come to something like famine rates (fall below, "say, ten seers per rupee)," then food should be supplied by Government.[2] Every effort must be strained to get ready store-houses and provide transport for this grain. Fourthly, if events become unfavourable, it may be necessary to distribute charitable relief to the old, to children, to persons in reduced health, and to others who may be unable to do a full day's work. To do this would be the charge of the Relef Committees: Government would give a grant equal to the amount they raised by private subscription "and may when distress goes very far be still more liberal." Fifthly, loans would be given to municipalities and landlords with which to carry on public improvements or works beneficial to villages; and in the case of petty village works which directly improve the water-supply, or are of direct advantage to the general public, Government would pay one-third of the cost. In conclusion, weekly reports were to be submitted by each district and the heads of the reports were prescribed.

17. *The Period of Preparation.*—During the month of December the fears regarding the winter rice crop in Bengal and Behar were realised. The rabi crops however sprang

[1] B. B. I, 48.

[2] This was afterwards relaxed to some extent at the instance of the Government of India, especially as regards Burmah "cargo" rice, which was found to contain much husk and was allowed to be sold cheaper than Bengal rice (December 22nd, p. 104).

up much better than had been expected, and in the end of January and beginning of February the long-wished-for rain fell in such abundance as to secure a good harvest, and considerably to contract the area and the degree of extreme distress. Enquiry was pushed on regarding the deficiency of supplies and the anticipations of famine; information was collected as to the extent and population of the parts where it would be intense; and estimates were framed of the number of people likely to need relief and of the food-grain which would have to be placed in the country in order to provide relief.

The great anxiety of the Government now was to throw as much grain and as early as possible into the famine tract, so as to be beforehand with the distress when it should break out, to take advantage of the favourable weather before fodder and water became scarce; and to be free to act with vigour in case the rabi crops should fail and the prospects of famine become more grievous. The slowness of the progress made in transporting the grain caused considerable anxiety. Out of 18¾ lakhs of maunds (or about 70,000 tons) which it was proposed to place in the distressed tracts by the end of January, on the 3rd January only about 6 had been despatched by railway from Calcutta and the North-Western Provinces, and only 3 or 4 lakhs had started from the railway stations for the interior, very little of which had arrived.

At last in the end of January, the time having come when it was expected that distress would be actively and keenly felt, Sir R. Temple was sent to Behar (he being then designated as successor in the Lieutenant-Governorship to Sir G. Campbell, whose health was so seriously affected that he was compelled to retire) to take charge of all relief organisations; his principal duty being to frame in communication with the local officers careful estimates of the number of persons in each district likely to come on relief, of the quantity of grain required for their food, and of the best means of providing transport for it into the interior of the district. About the same time a Central Relief Committee was appointed and a public meeting held (4th February); instructions were issued for the guidance of the local Relief Committees, and gratuitous relief was started all over the Famine Tract. By this time the numbers on relief-works had risen to 113,000; but hardly any gratuitous relief was given before February.

18. *Import and Transport Operations.*—The early part of this middle period witnessed an immense increase of activity in the importation and transport of food. During the whole of February Sir R. Temple was on tour in the famine tract, and after visiting each district, he framed estimates, in communication with the local officers (though not always in agreement with them, for his estimates generally exceeded theirs) of the numbers likely to require relief in any form, whether in payment of wages, in gratuitously given food, in the shape of advances of grain to be repaid afterwards, or the sale of grain where it was otherwise unpurchaseable, and of the provision of grain necessary. From Sir G. Campbell's first tentative estimate of 70,000 tons, subsequently raised to 150,000, the amount required now mounted up to 404,000 tons, or including reserves 480,000 tons.[1] To carry this quantity from up-country and from Calcutta to the railway stations of Behar and Bengal taxed severely, but did not surpass, the resources of the Railway Company, but to transport it from the railway stations to the interior of the country, and especially to the north of the Behar and Bhagalpur Divisions, before the rains should set in in June and make the roads impassable, was a Herculean task, which nothing but immense energy and gigantic preparations could have surmounted. Water routes were used wherever it was possible, but the dryness of the season impeded navigation. Steam ferries were established to cross the grain over to the north of the Ganges, and steamers were bought or built in the country, and ordered from England; altogether 41 steamers and about 7,000 country boats and canoes were employed on the ferries and the water routes. A temporary railway which was constructed to Darbhanga, at the rate of one mile a day, and at a cost of 330,000*l.* (of which 145,000*l.* was ultimately charged as the excess cost due to hurried execution on account of the famine), was opened on April 17th, and it alone carried 31,213 tons of grain, and 8,031 of fodder, before it had to be taken up in consequence of the floods in the second week of June. But the chief reliance had to be placed on country carts, and it was found necessary to abandon the system of hiring these direct from the cart owners, and to give contracts, at enormously enhanced rates,[2] for the conveyance of large quantities. These contracts were mostly

[1] B. B. II, 86. (T.)

[2] The exact figures are nowhere stated in the official correspondence and minutes. Sir R. Temple, in his closing Report, says (II, 76)—"The contracts involved a rate of hire just double that of ordinary times." The Author of the Black Pamphlet states that the usual rate for a two-bullock cart before the famine was about eight annas for a day's journey of 12 to 15 miles, carrying a load of ten maunds, and that under the contracts given in Behar, each cart was paid 2 rupees a day on an average, while for two districts contracts were given at the rate of six pies per maund per mile, or 4 rupees a day for a journey of 13 miles (pp. 73–4).

taken by companies of Indigo-planters. For fear of these arrangements breaking down, a reserve transport train was organised at Allahabad and sent down under the command of military officers, and in case an epidemic should break out among the cattle, a quantity of camels, mules and ponies were purchased from all parts of Northern India. About 100,000 carts and 230,000 draught or pack animals were at work in March. Altogether the casualties of the season amounted to 14,000 carts and 28,000 bullocks;[1] a loss which might have seriously crippled the operations, had it not been for the Reserve Train, the whole of which was in effect brought into action as soon as it was got together and arrived on the scene. Altogether 340,000 tons were carried from the north bank of the Ganges to the interior, by the middle of June.

19. *Increase of numbers in March.*—Early in March there was a sudden rush of vast numbers on to the relief-works in the Darbhanga and Madhobani sub-divisions. "About "400,000 persons came trooping in from the villages around and settled down on certain "lines of relief roads. Almost all were in destitution, most were in very poor strength "and condition, many were emaciated, and some were near starvation."[2] The rush was so sudden that the local officers were taken by surprise and for a time the crowds defied all discipline and management. Sir G. Campbell recorded in his minute of March 28th[3] that up to that time there had been no such lack of food as had been dreaded. Active private import was going on, and food, though dear had not reached extreme famine prices. The bazaars were well supplied with grain, principally pulses, rice being scarce and dear. The time had not come for sales to the public, but he directed[4] that the stores should be opened for the relief labourers, and rice sold them at 10 seers per rupee: it could not be sold cheaper (at 12 seers, as had been proposed) without deranging a still active private trade.

20. *Close of Sir G. Campbell's tenure of Office.*—On the 8th April,[5] Sir G. Campbell made over the office of Lieutenant Governor to Sir R. Temple. In the last letter written during his tenure of that post, dated April 6th,[6] the following description of the prospects of the season is given. The present season so far promises very well. There had been a beneficial fall of rain in Northern Bengal, and if the ensuing months are showery—

Para. 7. "The Lieutenant-Governor would hope that, after the provision which has been made for supplying the distressed districts and maintaining a reserve, the condition of the people in the greater part of Bengal Proper may not be greatly changed for the worse.

"In the parts of Behar where the rabi harvest has for some weeks given employment to the people, we must expect a large accession to the numbers for whom employment and relief provision must be made between the end of the rabi harvest and the rains. But if the unusual drought is followed by early rains, as is frequently the case, that period will not be very long; and when good rains commence, we may expect that, in all districts not reduced in an extreme degree, the people will of their own accord betake themselves to agricultural pursuits."

21. *April estimate of the requirements of Relief.*—In April, sufficient knowledge having been gained regarding the state of the country, Sir R. Temple framed[7] the following estimate of the area of suffering, and the amount of relief required:—

| —— | Area in square miles. | Population. | Number expected to require relief at the worst season. | Per-cent. | Quantity (in tons) of grain allotted. |
|---|---|---|---|---|---|
| Very distressed tract - | 20,950 | 10,700,000 | 2,805,080 | 26·2 | 330,000 |
| Partly distressed tract - | 19,159 | 7,064,650 | 918,484 | 11·5 | 74,000 |
| TOTAL - - | 40,109 | 17,764,650 | 3,723,564 | 20·9 | 404,000 |

The very distressed tract contained a large portion of the Districts of Saran, Champáran, Tirhut, Bhagalpur, Purneah, Dinajpur, Rangpur and Bogra: the partly distressed tract contained portions of Shahabad, Gya, Monghyr, Santhalia, Malda, Rajshahai, Pabna, Murshidabad, Jalpaiguri, Bardwan, Birbhum, Bankura and Manbhum.

22. *Condition of the country in April.*—The following passage[8] shows Sir R. Temple's view of the condition and prospects of the country in the middle of April, shortly after he assumed the reins of government:—

"There was, on the whole, every reason to fear that the larger portion of the people in the worst tracts would be forced to look to the State for assistance, more or less until August. The official

[1] B. B. II, 98. (T.) [2] B. B. II, 83. (T.) [3] I, 326. [4] I, 341. [5] II, 91. (T.)
[6] I, 349. [7] B. B. II, 87–8. (T.) [8] B. B. II, 91–2. (T.)

investigation had penetrated to every village. It was proved that the class of destitute poor and beggars, ordinarily supported by private charity, could no longer be sustained by these means, the donors of such alms being themselves in straits. It was found that the non-agricultural classes—weavers, workers in metal of all kinds, carpenters, artizans of all sorts, fishermen, menials and others—had nothing to eat, and where wholly out of work; that the extensive class next above these, namely, the field labourers, and the small cultivators who occupy some land and eke out their livelihood by working on the land of others, had eaten up their little stores and were bereft of employment. It was further apparent that destitution was gradually creeping over other classes, such as the cultivators generally (with the exception only of the occupancy tenure-holders) and such as the Brahmans, whose habits and notions unfitted them for active work. Although the distress had been successfully checked in most places, the cases of starvation being very rare, yet in some places distress was discovered to have reached a critically dangerous degree, relief arriving only just in time to restore the emaciated, to resusitate the fainting, and to avert considerable mortality."

It was then decided that all gratuitous relief should be given, and all relief wages paid, in grain, and that sales to the public might be much more generally authorised.

23. *Close of famine.*—In Behar the rains began early in June[1] and fell in a very favourable manner, and the numbers on relief-works which had reached their climax in the first half of June, fell rapidly in June and July as the people dispersed to agriculture. An unusually large area was sown with the early crops, millets, &c., which ripen in August and yield the speediest return. The number on charitable relief, however, went on increasing,[2] "because distress is extending over those of the lowest classes who "cannot work, and upwards among those ordinarily above work, and because the whole "class of professional beggars is thrown on the hands of Government." The men labouring on relief-works had also supported infirm dependants with their surplus wages, and when they dispersed to agriculture, they left these people to be supported by Government. In August the numbers of these classes also began to diminish, and in September relief was almost at an end. In Lower Bengal, however, the case was slightly different, for there a second failure of rain was threatened, none having fallen in August. But the destruction of the winter rice was averted by a timely downpour after the first week of September. During this time of suspense the numbers on relief mounted up rapidly, but they declined again when the rain fell and relief was administered with somewhat greater stringency. By the end of October, the special establishments and the large organisation collected together for the relief measures, were broken up; all but the accountants and auditors who were still busy in settling and posting the accounts.

24. *Calculations as to numbers relieved at different times.*—The number of persons who were receiving assistance from Government on the 15th June were thus calculated[3]:—

"In order to make the estimate * * * * we have the following data to form a basis:—

| | |
|---|---|
| Total number of relief labourers | 1,770,732 |
| Total number of persons on charitable relief | 401,959 |
| Total grain expenditure, in maunds, of first half of June | 843,000 |

Thus we have 2,172,691 persons receiving relief, quite irrespective of those who are living on advances or purchases of Government grain. The amount of Government grain disposed of during the fortnight would give three-fourths of a seer a day to 3,401,900 persons for a fortnight. But among the people who consumed Government grain were all the persons on charitable relief, and a large portion of the labourers. The district narratives show that by the end of the first fortnight of June, the practice of paying all labourers in grain, though largely introduced, had not been fully carried out. The Bhagalpur return is the one which best distinguishes between sales to the public and those to labourers; and that shows 98,228 maunds sold to the public, as against 25,628 maunds sold to the labourers. All the district narratives show that the non-labouring public are the chief customers at our granaries.

"It would therefore be probably within the truth to take one-half of the persons supported by Government grain as being outside the relief labour and charitable relief lists. By this reckoning, the total numbers receiving assistance in one shape or other would be—

| | |
|---|---|
| Labourers and paupers as above | 2,172,691 |
| One-half the consumers of Government grain | 1,700,950 |
| Total | 3,873,641 |

"The best estimate that we can now frame shows that the numbers at the worst period was 3,900,000 persons receiving assistance of some sort.

"As stated at the time, this statement, though very large, may have been slightly under the truth, certainly not above it. It apparently agrees, as nearly as could be expected, with the estimated numbers given at the beginning of April, as shown in Chapter III" (see paragraph 21 above). "The general per-centage of this number on the population affected was seen in that chapter to be 26 per cent. in the most distressed districts and 11½ in those less distressed. The ratio of course varied considerably, being in many places less than that above stated, but in the worst tracts of North Behar it stood as high as from 50 to 70 per cent."

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[1] B. B. II, 102. (T.) [2] II, 38, 14th July. [3] *Ib.* II, 101–2. (T.)

"But there was a further mode whereby assistance was rendered by Government which could hardly be included in any particular statement presented at that time, namely, the cash advances made by Government to individuals, European planters, native traders, and others for the importation of grain; and to landholders and zemindars for agricultural improvement. These advances of cash went on month by month, till they reached the sum of 46 lakhs of rupees, or close upon half a million pounds sterling. How many persons virtually derived their subsistence from this source it is impossible to say. But the sum was enough for feeding 500,000 persons for seven months, and that number ought at least to be added to the 3,900,000 given in the above statement. On the whole, then, nearly four and a half millions of souls must have been receiving assistance directly or indirectly from the State at the worst period. Under this view of the case, it must be admitted that the actual distress did exceed the estimate. But in reference to the uncertainties of the case, the difference between the estimate and the probable actual is not great."

A similar estimate was made[1] for the numbers on relief on the 15th August—

| | |
|---|---|
| Labourers on relief-works - - - - | 426,738 |
| Persons on receipt of charitable relief - - - | 647,550 |
| Persons living on purchases of Government grain, being the number of people that would be supported for one month by the grain sold between the 15th July and 15th August, at the rate of ¾ths of a seer per day per head - - | 1,282,464 |
| Persons living on advances of Government grain, being the number of people that would be supported for one month by the grain advanced between the 15th July and 15th August - - - - - - | 1,692,936 |
| Add for persons still deriving support from advances of money made to zemindars and other residents - - - | 200,000 |
| Total - | 4,249,688 |

At the end of October[2] about 150,000 were in receipt of Government assistance, and these were principally in the Bardwen Division.

"The only district north of the Ganges which shows any appreciable number of such persons is Saran. This most fortunate decline has occurred from the middle of September onwards at a quicker rate than was anticipated when the estimates of distress were first formed. Those estimates provided for 520,000 persons needing assistance during October, and 316,000 in November. Experience on former occasions showed that considerable distress occurred in the autumn. It seemed proper to assume that the same thing would happen on this occasion. In many of the worst districts the autumn crops were known to be small in ordinary years. It was therefore feared that such tracts would not receive a new supply in sufficient quantity till December. As it has happened, however, the distress at this season has proved very slight in most districts, and has so far most agreeably disappointed expectation. The cause is to be found partly in the administration of relief which had been going on during the previous months, which maintained the people in fair condition during the crisis, and so facilitated their discharge towards the end, but chiefly in the abundant produce of the early autumn crops, which, as already described, had been sown over so much larger an area than in ordinary years."

## Special Establishments and organisation for Relief.

25. *First step to organisation.*—In December[3] the first steps were taken to strengthen the ordinary establishments. The appointments then considered necessary were a Special Relief Commissioner for the Rajshahye Division, an Extra Secretary to Government, two officers to superintend the import and transport of grain from Calcutta, about 34 superior officers to be employed under Commissioners and District officers in general relief-work, and some 700 extra clerks, store-keepers, transport agents, peons and store-house guards, &c., in the lower grades. A special office was created to keep and audit the famine accounts. The total charge was to be Rs. 38,000 a month, or three lakhs of rupees to the end of September.

26. *Second step.*—In February[4] this estimate was raised by the addition of a Relief Commissioner for Northern Behar, an inspector of transport arrangements at Patna, 25 military officers for transport duty, a medical staff consisting of 2 surgeons, 8 apothecaries and 60 native doctors, 24 superior and 24 inferior native revenue officials, 600 guards and 20 clerks: the additional cost was to be Rs. 32,000 a month. The total cost for six months was estimated at five lakhs of Rupees.

27. *Completion of the scheme of organisation.*—In the minute[5] written on the 28th March, after Sir G. Campbell's visit to Darbhanga, he dwelt as the first and most important point of all, on what had been done and what remained to do to secure a completely efficient system of relief administration. Circles and sub-circles had been formed under European and Native officers. What was most wanting was "inferior "machinery reaching down to each village." This must be obtained as far as possible by

[1] B. B. II, 107. (T.) [2] *Ib.* II, 108. (T.) [3] *Ib.* I, 66. [4] I, 233. [5] I, 324.

utilising the zemindars, headmen and village accountants. They must "keep a nominal " roll of all persons in the village receiving relief either on works or gratuitously. " Through them the village management may be conducted, and they will be responsible " to check abuses." He held that more reliance might safely be placed on native superintendence. There was an unreasoning prejudice in favour of European agency: but it was impossible to procure a thoroughly competent and trustworthy European for every circle and every work. Altogether 260 European officers of superior rank had been sent, and besides them a large number of native officials from other parts of Bengal and from the North-western Provinces, and several native officers of the Army. In this way, he aimed[1] at getting for each circle (1) a competent officer in charge, whether European or Native, (2) a capable assistant generally a native, (3) an officer specially to supervise the relief works, and see that the labourers work well and are paid properly, and (4) an inferior native assistant. Under the circle officer come the superintendents of village groups, that is to say, "over each group of villages, there will be some one in charge " to look after the relief operations generally in the villages, to manage the grain stores, " and inform the circle officer of what is going on." But beneath all this, he dwelt very strongly on the necessity of extending the system down to the village itself, and of " not acting as if they were in a strange or hostile country, but utilising those whose " duty it is to assist the people, and finally through them, or in the last resource without " them, to get at the headmen and representatives of the people themselves."

"[2] The moment we go beyond the stage of great public works, it is totally impossible to deal with the people in detail, unless we have them localised and individualised, village by village, and name by name. We cannot send them away from the roads till the village machinery is ready to receive them; we cannot distinguish people receiving relief by labour, charitable relief, and relief by advances, or prevent the same persons from receiving relief in different shapes, till we have all those receiving relief registered, name by name, according to their villages, by some person who knows them, and who can be made responsible for their coming and going. Above all, it will be totally impossible to deal with the people on our hands, and wean them eventually from dependence on Government, unless we have an individual knowledge of them in their villages."

28. *Object of the organisation.*—The main object of all this organisation was to substitute direct personal knowledge for self-acting tests—

"[3] When the arrangements we are now making in the most distressed districts are complete, I trust that we shall be able to lay our hands on each person requiring relief according to his residence and circumstances. We shall be able to say in each village—here are so many persons found to be fit objects for relief; so many are doing work of some sort; so many are receiving a charitable allowance of food; so many have received or will receive advances to enable them to continue their cultivation; so many residents of this village are absent working on such a public work. On the public works, again, I hope we shall be able to say—here is a gang from such a pergunnah and a gang from such another pergunnah; so many (name by name) from such a village, and so many from such another. It is only when things are so arranged that we shall be able to deal with the needs of the people in detail, and to supply their wants without the great abuses which must attend indiscriminate liberality to great multitudes whom we cannot distinguish.

" Employment on works I have already dealt with.

" Employment in the way of spinning, weaving, &c., is, as before arranged, to be given as much as possible to those who cannot go on the roads. If we have sufficient information and sufficient machinery, charitable relief is only a question of discretion and honesty. Cooked food being reserved for special cases, it remains to give a fair allowance of food gratuitously, or at a reduced price, and so much money as may be necessary to supplement it, to those really in need of such assistance."

On the 30th April[4] the Government of Bengal reported the arrangements made up to date for the supervision of relief measures. There were 18 sub-divisions, officered by covenanted civilians; 91 circles, each under a superior official, European or Native; 190 circle assistants under those 91 circle officers; and 450 group or sub-circle officers, who were generally subordinate revenue officials or non-commissioned officers of the Native Army. All these posts had been filled, but to provide for the vacancies that must occur from sickness and unavoidable causes, a reserve of from 10 to 20 per cent. of these numbers had to be arranged for, and 120 officers of these different grades were either appointed in Bengal, or transferred from other Provinces, or warned to hold themselves in readiness to start as soon as they might be ordered.

29. *Fuller accounts of the special organisation.*—In his final report, Sir R. Temple gives an interesting account of this remarkable and elaborate organisation. The country[5] was divided into circles, of from 50 to 100 villages; each circle to be the unit of relief administration, supervised by a European or Native officer with a staff of subordinates, and with at least one grain depôt from which the smaller granaries in the circle should be supplied; the object being that all relief operations should be inspected at least once a week, and supplies distributed in every severely distressed village. It was expected

[1] B. B. para. 30. [2] *Ib.* para. 7. [3] *Ib.* para. 34. [4] *Ib.* 370. [5] *Ib.* II, 78–79. (T.)

that there would be 150 such circles, and each circle would need at least 10 inspectors of villages, each with a granary; every granary would need a store-keeper, and the circle officer would need several for his central depôt, besides native clerks: thus altogether about 25 subordinates would be needed in each circle. In the less distressed parts the circles might be less elaborately equipped. The actual details of the organisation as finally settled were shown as follows[1]:—

| | |
|---|---|
| District and Sub-Divisional Relief Committees | 90 |
| Organised circles under Government officers | 158 |
| Sub-circles or groups | 1,141 |
| Circles under private persons, European or Native | 242 |
| Sub-Committees | 650 |

The equipment of these was:

| | |
|---|---|
| European superior officers | 102 |
| Circle officers | 158 |
| Native officers | 1,279 |
| Grain keepers and other subordinates | 3,395 |
| Private persons, European or Native, employed on relief | 2,026 |
| European Surgeons | 5 |
| Native Assistant Surgeons and Doctors | 136 |
| Special Chief Engineer | 1 |
| Superintending Engineers | 4 |
| Executive and Assistant Engineers | 56 |
| Overseers and subordinates | 113 |
| Grand Total | 7,275 |

The actual cost of this establishment is shown in the final accounts to have been Rs. 25,00,000.

30. *Results achieved by the special establishment.*—The history of famines can show no parallel to the elaborte organisation summed up in these figures, carried out as it was with all India to draw upon for men, with no restriction as to money, and on the system laid down by the greatest Administrator of the time. That this relief establishment was admirably efficient in paying wages, in advancing loans, in distributing and selling grain, in saving life, and preventing hunger, is abundantly proved by the results. Whether it was as discriminating as it was efficient, the official reports are altogether silent. Evidences are not wanting, as will be related further on, that in some cases the demands made, even on this great establishment, were heavier than they could meet: but on the whole there is little to show to what extent, or whether to any extent at all, it realised the magnificent ideal of Sir G. Campbell, that it should be able to learn everything about everybody, and that relief should be given to each applicant on the personal knowledge which the relieving officer possesses of his wants. Considering, however the difficulty of achieving any such result under the most favourable opportunities, the little leisure which any of these officers had to become acquainted with the hidden resources of the people, the little experience of Administration or knowledge of the language possessed by most of them, the enormous number which they had to deal with, and the pressure that was imposed on them to be liberal rather than economical with the resources of Government, it seems highly improbable, in default of the most positive evidence, that such an aim can have been to any great extent attained. And on the whole it cannot be said that the experience of this famine proves that it is possible for an establishment, however numerous and able, to administer relief to a great body of people without the application of self-acting tests, or in pure reliance on their personal knowledge of the circumstances of the applicants.

## Prohibition of Exportation.

31. *First suggestion of prohibition.*—The arguments used for and against this important step deserve to be summarised with some degree of fullness. In his first letter (October 22nd) reporting the probable advent of a scarcity, Sir G. Campbell[2] begged "to suggest "that the export of rice to foreign countries from Indian dominions might be stopped." If there was a general failure in Bengal, all that India and Burma could supply would go but a little way to fill up the vacuum. On this the Government of India wrote—

"We have not thought it desirable to issue this order; and it appears to us to be probable that the wiser course will be obtain any supplies of rice which may be necessary by purchase, directly or indirectly, rather than to take a step which must necessarily derange trade, give occasion to claims to

[1] B. B. II, 89-90. (T.)

[2] *Ib.* I, p. 3.

compensation which it would be difficult to adjust and which might not add materially to the stock of rice available to meet the apprehended scarcity."

On the 1st December[1] the Secretary of State approved the Viceroy's decision in the matter.

On the 7th of November[2] the Viceroy wrote to the Secretary of State that he believed the deficiency in Bengal and Behar could be met without importation from abroad or from Burma, that the rise in prices which has occured and must increase would of itself attract rice from Burma to Calcutta, and that to prohibit exports would have the effect of artificially reducing prices at the beginning of a season of scarcity, and would shake the confidence of the mercantile classes.

32. *Further arguments for prohibition.*—On the same date,[3] the Lieutenant-Governor wrote that he accepted the decision of the Viceroy not to prohibit export from Burma.

" * * * But he desires to submit that even if it be decided not to interfere with the great export of 700,000 tons of rice which goes yearly from British Burma, still the Government of India might very reasonably and fairly consider the expediency of interposing (by legislation, if necessary) to prevent exportation of food from Bengal.

" The port of Calcutta has in ordinary years sent away about 350,000 to 400,000 tons of food-grains per annum ; in the current year it may be expected that eventually common rice in Calcutta will be too dear for export, though at this moment export is going on, as much as 94,000 maunds having been exported since the first of the present month. But from the ports of Chittagong and Morellgunge, whence were exported from 50,000 to 70,000 tons of rice during the last year, and from whence common rice only is exported, large consignments of rice will continue to be exported to the Mauritius, Galle and other rice-consuming British, French and Dutch colonies. The rise of a rupee or so per maund in price will not prevent these colonies from getting their supplies of Bengal rice just as heretofore, and the rice exported from Chittagong comes into the market far earlier than Burma rice ; in fact, new rice is already coming into Chittagong. The East Bengal rice, moreover, being 'ballam' rice is of a kind which is much more acceptable to the people of the distressed districts than Burma rice can be. If this rice cannot be exported, it will find its way to the distressed districts. The West India and other colonies will still have many sources to indent upon ; and so their populations (Indian and others) cannot suffer so long, at any rate, as Burma export continues."

To this the Viceroy still repiled[4] in the negative. " The natural effect of a rise in " price must be to check, and ultimately to stop, export altogether," and in fact the amount exported in October was not half the exports of the corresponding months of last year.

33. *Sir G. Campbell's view of the effects of non-prohibition.*—On the 23rd December[5] the Lieutenant-Governor wrote again to explain the condition of trade which was then going on. The Government of India had taken exception to the remark that " the Commissioner of Bhagalpur was told that if exportation was going on in his Division, h might fairly purchase in the local markets so much as would practically put a stop to the export of grain." Sir G. Campbell explained that as the Commissioner had to lay in a stock of food for his relief-works, and there was a considerable export of grain going on, it seemed " unnatural that while private traders were exporting grain, we should be " importing it to the same localities." And he quoted a story told by the Magistrate of Bhagalpur that cartmen were especially willing to carry Government grain to the north of the district, because they expected to get return loads of grain to bring back from thence. It seemed obviously better therefore that the Commissioner should buy his grain locally, till prices should rise so as to make it unprofitable export. But this was what was going on over all India. The very ships that brought Burma rice to Calcutta, brought it the more readily because they were sure of getting freights of Bengal rice to carry away. " To follow the law of free trade and supply has consider- " able advantages ; to interfere with free trade by stopping export, securing the maximum " supply which the country affords, and then importing as much more as is required, " has also advantages, more considerable than the former course : but to follow a middle " course, neither trusting to the law of supply and demand nor stopping the export of food, " may lead to this, that one set of forces militate against and neutralise the other, and we " gain nothing whatever, but rather may lose on the whole." He then refers to the lowness of prices and says—

[6] " The apprehension which has lately been growing in Sir George Campbell's mind is that in truth the imports and arrangements to import on the part of Government may by keeping down prices have been a main cause of the export. He has begun to fear that it may be possible that Government imports without the prohibition of exports may do more harm than good. The imports facilitate and increase exportation by cheapening rice in the Bengal markets."

Government might no doubt raise prices at once by going into the market and buying grain; but this would cause violent perturbation and distress to the people by raising prices in a degree altogether disproportioned to the extent of the purchases, while

[1] B. B. I, p. 121. [2] *Ib.* I, p. 9. [3] *Ib.* I, 28-29. [4] *Ib.* I, 30.
[5] *Ib.* I, 111. [6] *Ib.* I, 113.

it would have hardly any effect on the export trade. Merchants have their orders for distant countries; in many of these countries rice is a luxury rather than a necessity; and freight and other charges remaining the same, the prime cost of the articles less affects the whole price than in the case of consumers in this country. The exports would not be stopped by mere enhancement of price without reaching prices which must cause severe famine in the country.

The Governor General in reply[1] deemed it "sufficient to state that the Government "of India have no intention of altering the policy which has been already laid down, and "which has received the approval of Her Majesty's Government."

34. *Amount of exportation from Bengal.*—On the 5th January[2] the Lieutenant-Governor calculated that the exports of the year from Bengal would be from 150,000 to 200,000 tons, and that provision must be made for restoring that quantity by importation.

35. *Lord Northbrook's argument against prohibition.*—On the 30th January[3] the Viceroy wrote a Minute, setting out in full his views on the subject, and the arguments which influenced him in the decision he had come to. As to prohibition of exports from all Indian ports, he did not think it necessary to discuss the proposal at length: Burma exports 700,000 tons annually, and to have stopped this would have been to inflict a fatal blow on its trade: Madras exports 100,000 tons of rice annually to Ceylon, which is consumed by Indian coolies, and Ceylon cannot be looked on as a foreign country. The question is therefore narrowed to Bengal, which in 1872-73 exported 526,000 tons; of this about 80,000 tons is "table rice"—a luxury; of the balance, or 446,000 tons of "common rice," 189,000 were sent to British Indian ports including Ceylon, 160,000 tons to the West Indies, Mauritius and other places, mostly for the use of Indian coolie emigrants; and the remaining 97,000 tons principally to England and the Persian Gulf. It would have been unjust to stop the supply of the usual food of Bengal coolies in the Colonies; and the whole quantity exported is small when compared with the consumption of 60 millions—some 30,000 tons a day. The prohibition would have excited confidence unduly and lowered prices, consumption would have been stimulated instead of being reduced, which is the natural effect of a rise of prices and the greatest safegaurd against famine.

Even if this were not so, any advantage derived for the time would have been dearly purchased by the probable consequences for the future. An export trade in food-grains is a great advantage to a country like Bengal, since it ensures the production, in ordinary years, of more food than is required for the consumption of the people. The natural rise of prices in times of scarcity diverts a portion of the ordinary export for home consumption, and thus a reserve easily and readily available is habitually maintained. Thus the exports were—

| | Tons. |
|---|---|
| in 1864-65 - - - - - - - | 695,341 |
| in 1865-66 (a year of scarcity) - - - - | 336,211 |
| in 1866-67 „ „ - - - - - | 222,659 |
| So, too, in the three months October to December 1872 the exports were - - - - - - - - | 113,277 |
| while in the three months October to December 1873 the exports were - - - - - - - - | 64,425 |

"It follows that any measure that would diminish the export trade in common rice from Bengal would weaken the power of the country to meet any future period of scarcity. Trade is readily diverted from one channel to another. The interference of Government with its free course may easily destroy it. If we refuse to supply our ordinary customers at any price, we oblige them to have recourse to other markets, and it is impossible to assume that when we want them again they will return to us.

"Bearing in mind, therefore, the permanent harm that might be done by an interference with the export trade in food-grains, and being satisfied that the Government could without difficulty bring in a larger quantity of rice than is exported even in ordinary years, I had no hesitation in preferring the the latter course, and I see no reason to doubt the correctness of the conclusion at which I then arrived."

36. *Concurrence of the Home Government.*—On the 23rd January[4] the Secretary of State wrote again, referring to this subject, that "Her Majesty's Government desire to "intimate their entire concurrence with you that the objections to this measure far "outweigh any recommendation in its favour. . . . . Nothing could justify such "a measure, except certainty, or reasonable probability, that exports of food will "so exhaust the resources of India as to render them incapable of affording the "supplies which may be required for the affected districts:" and no such result was even probable.

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[1] B. B. I, 115. [2] *Ib.* I, 152. [3] *Ib.* I, 201. [4] *Ib.* I, 309.

37. *Exports from Bengal.*—The returns[1] of exports from Bengal for the six months October—March, give the following figures :—

| | Table Rice. | Common Rice. |
|---|---|---|
| | Tons. | Tons. |
| October 1872 to March 1873 - - - - - | 36,209 | 239,337 |
| „ 1873 „ 1874 - - - - | 26,271 | 129,996 |

## Estimate of Grain to be Imported.

38. *Earliest Estimates.*—The first estimate of the quantity of grain to be imported is contained in a letter from the Bengal Government, dated 11th November,[2] in which the Lieutenant-Governor says that he would like to be able to store, by the end of March, 50,000 tons. In the Special Narrative for November 28th it was stated[3] that the Lieutenant-Governor had arranged for the purchase of 600,000 maunds (22,040 tons) in Bengal, Orissa, and North-Western Provinces, of which three-fourths were to reach the distressed districts by the end of December.[4] The Government of India then invited him to frame an estimate of the probable quantity of grain required. This was done on the 2nd December.[5] The population of the distressed districts was put at 25 millions, one-twentieth of which would consume 18,75,000 maunds (at two-thirds of a seer a day) in three months, or nearly 70,000 tons: of this the Lieutenant-Governor had ordered about 35,000 tons, and he looked to the Government of India to provide the remainder. If this quantity was imported, the Government would be able to prevent severe distress up to the end of April; and long before that (say by the end of January) it would be known how the spring crops were turning out and what the requirements of Government would be. To this the Government of India replied[6] that the estimate of two-thirds of a seer per head per diem seemed too high, probably half a seer was enough, and this would reduce the requirements to 50,000, instead of 70,000 tons; but still that they did not propose to lower the estimate of 70,000 tons, as a margin is desirable; that Bengal had ordered 28,500, not 35,000 tons; that the Government of India had ordered more than the 35,000 tons[7] asked for, but were not sure if it would arrive by the end of January; in any case the quantity asked for would come well within the period of three months beginning with 1st of February, and the rest would arrive in April and May. The Lieutenant-Governor replied that he was anxious to get the 70,000 tons sent up country, and placed ready for delivery before the end of January, so as to be prepared for the worst; for if the spring crops failed the area of distress would be extended to Central and Western Bengal, and it would be impossible then to convey more than 200,000 tons into Behar and Northern Bengal by any Government agency before the rains began. He therefore urged that the despatch of the 35,000 tons from Burma should be expedited as much as possible, so as to arrive before January 31st. This the Government of India promised to do. The Lieutenant-Governor then provided for the distribution of this grain: 9 lakhs of maunds to the Patna Division; 3 to Bhagalpar; 3 to Rajshahai; and the balance ($3\frac{3}{4}$ lakhs) to be kept as a reserve.

| | Distribution of December 6th, pages 93–4. | Distribution of January 13th, page 106. |
|---|---|---|
| | Mds. | Mds. |
| Patna - - - - | 1,00,000 | 50,000 |
| Gya - - - | 1,00,000 | 1,50,000 |
| Shahabad - - - | 1,00,000 | 50,000 |
| Tirhut - - - | 2,00,000 | 2,75,000 |
| Saran - - - - | 1,00,000 | 1,25,000 |
| Champáran - - | 1,00,000 | 1,50,000 |
| Soane Canal - - - | 1,00,000 | 1,00,000 |
| Gandak Embankment - | 1,00,000 | 1,00,000 |
| Monghyr - - - | 1,00,000 | 1,00,000 |
| Bhagalpur - - - | 1,00,000 | 2,00,000 |
| Purneah - - - | 1,00,000 | 2,00,000 |
| Dinajpur - - - | 1,25,000 | 1,95,000 |
| Rangpur - - - | 50,000 | 70,000 |
| Bogra - - - - | 25,000 | 20,000 |
| Rajshahai - - - - | — | 20,000 |
| Malda - - - - | — | 20,000 |
| Northern Bengal Railway - | 1,00,000 | 1,00,000 |
| Total - - | 15,00,000 | 19,25,000 |
| Reserve - - - | 3,75,000 | |
| Total - - | 18,75,000 | |

[1] B. B. I, 362. [2] *Ib.* I, 40. [3] *Ib.* III, 15.
[4] *Ib.* I, 63. [5] *Ib.* I, 87. [6] *Ib.* I, 89.

[7] They had ordered 80,000 tons at the time (see letter to Secretary of State, paragraph 12, page 86), but apparently thought it better not to let Bengal know the exact quantity.

39. *Increased Purchases in Bengal.*—On the 3rd of January,[1] the Bengal Government reported that through divers causes, such as misconception of orders and a desire to preserve a safe margin lest some orders should fail to be executed, they had directed the purchase of 13,62,000 maunds (or 50,000 tons) instead of the 38,000 tons formerly arranged for. From this time the purchase of grain for famine requirements was entirely taken over by the Government of India, the care of providing transport and forwarding the grain to the distressed tracts being left to the local Government.

40. *Estimates considered too low by Secretary of State.*—About this time was received an important despatch from the Secretary of State,[2] dated December 1st, in which the following passages occurred :—

"Repeated experience has sufficiently proved that, when scarcity and the danger of famine arises in India, the ordinary operations of commerce and the ordinary processes of supply and demand cannot be relied on for any adequate supply of food to the affected districts, and that, without the active intervention of Government, the worse consequences are liable to ensue.

* * * * * *

"Scarcity in India is apt to outrun in its amount and in its effects all previous estimates of the danger, and if your Government is determined to secure in time an amount of food fully equal to the largest deficiency which can be calculated upon, it will be able to draw upon an adequate supply."

This despatch was necessarily understood as suggesting a still ampler provision against any mishap, and it could not but diminish the inclination of the Government of India to study economy in its measures.

41. *Revised Estimate by Sir G. Campbell.*—On the 5th January,[3] Sir G. Campbell sent up a revised estimate of the wants of the country. He considered that on the whole the country had enough food in it to support the population, but that the exports from Bengal across sea (which he calculated at 150,000 tons) would have to be replaced, and some further amount supplied to Benar. He thought it necessary to provide for a continual flow of food towards the distant and most affected tracts—and for a reserve of food for the districts nearer the seaboard and in more accessible regions, which might be drained by such a supply, as well as by the exports across sea. Including the quantities already imported, he designated 350,000 tons as the amount likely to be required :—

| | Tons. |
|---|---|
| For the more remote distressed districts where famine has been worst - | 125,000 |
| To replace supplies sent from Bengal to the same places - - | 75,000 |
| To replace grain exported over sea - - - - | 150,000 |
| Total - - - | 350,000 |

The Government of India replied[4] (January 6th) that provision had already been made for 75,000 tons beyond the 70,000 tons previously mentioned, and that this would arrive before the end of April.

42. *Amounts purchased up to end of January.*—On the 30th January,[5] in a despatch to the Secretary of State, the Government of India reported what they had done up to that time. Beginning with the explanation that whereas their first intention had been to provide grain only for labourers on relief-work, leaving to the Relief Committee the purchases required for gratuitous distribution, they had afterwards decided (as it was not considered desirable to constitute the Central Relief Committee so soon) to provide supplies of food for all relief operations, the Government went on to state that up to that time Bengal had bought 50,341 tons, and they themselves 291,500, of which 47,000 had arrived; and this was exclusive of considerable quantities purchased by the courts of wards and by planters, zemindars, &c., with the help of advances received from Government. This provision, they say, was based on the calculation that the affected population was twenty-five millions ; that the largest number ever known to come on relief of all kinds whatsoever had been 10 per cent. or two and a half millions, and that the food of that number at 1 lb. per day for seven months, amounted to 240,000 tons. They had further provided a reserve of 100,000 tons.

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[1] B. B. I, 116. [2] *Ib.* I, 121. [3] *Ib.* I. 150.
[4] *Ib.* I, 155. [5] I, 198-9.

43. *Sir R. Temple raises the Estimates.*—On the 31st January,[1] Sir R. Temple wrote, concerning Tirhut, the first of a long series of minutes in which he dealt successively with the probable wants of each of the distressed districts. The Tirhut District contained a population of four millions of people and had received, on Sir G. Campbell's distribution of January 13th, an allotment of 275,000 maunds. The estimate now made of its requirements was four millions of maunds. The local officers calculated that they might have a million of people on their hands, receiving relief in some shape or other; the worst months would be May and June, but the months of April, July, August, and September would be almost as bad; to feed a million of persons for six months would require three and a half million of maunds; altogether it would be safer to provide four millions; and to ensure getting this quantity it was necessary to make contracts for the transport of five millions. Sir G. Campbell demurred to this estimate as excessive: it assumed that 25 per cent. of the population of the whole district, and 50 per cent. of that of the part most distressed, would be on relief—a proportion never known before; it made no allowance for reserved stocks or for the quantity, small as it was, produced in the harvest; it took no account of private trade which was however fairly active; and it reckoned on giving 4 maunds of food (or $1\frac{1}{2}$ lbs. a day for seven months) to each person on relief, whereas he himself considered that to allow 1 lb. per day or $1\frac{1}{2}$ maunds per head for four bad months was sufficient.[2] Finally, Sir G. Campbell held that if two million maunds were sent to Tirhut, it would be ample, and probably this (or 1,00,000 maunds a week) would be as much as the district resources could accomplish. The Governor General replied[3] that he was much disappointed to find that the district officers had "so long neglected fully to appreciate the requirements of those parts of the country," that Sir R. Temple had—

"exercised a wise discretion in recommending that four millions of maunds of grain shall be provided for the district of Tirhut, and that arrangements should be made for the transport into the interior of a larger quantity, in order that the probability that part of the transport arrangement will break down may be guarded against beforehand."

Sir George Campbell made no further expostulation against Sir R. Temple's estimates.

44. *The Viceroy approves increased Estimates.*—On the 13th February,[4] the Government of India reported to the Secretary of State, with an expression of their full approval, Sir R. Temple's estimate of the needs of Champáran—one million maunds to feed an average of 217,000 persons[5] for eight months at $\frac{3}{4}$ seer a day, and 6,50,000 maunds for Saran, of which 1,50,000 would be provided by the Hatwa Raja for his own estate. This, added to the amount already estimated for Tirhut, brings out a total of about 180,000 tons required for North Behar: the Government had already made arrangements for this quantity, and had no doubt they would be able to lay it down before the 15th June.

45. *The estimate for Purneah.*—It is unnecessary to particularise all of these estimates necessarily made by Sir R. Temple in extreme haste and based on the best information he could obtain, though he himself fully admitted the imperfectness of that information. One more instance will suffice—that of Purneah. In this district he estimated that half the population were not likely to be distressed at all, and that less than half of the remainder would be severely distressed, and he recorded[6] that "the "distressed tracts are receiving much benefit from private trade, are easily accessible by "means of a trunk road and a navigable river (Mahanadi) and are close to tracts blessed "with good harvests." The Collector estimated that 130,000 persons would need relief, 85,000 of them being in the distressed tracts, and this estimate was "carefully made "with percentages separately taken out on each caste or class as given in the Census "Statement." The Commissioner raised the estimate to 150,000. Sir R. Temple, following the Behar precedents, calculated that the number on relief would be 240,000,

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[1] B. B. I., 224.

[2] Mr. Metcalfe (Additional Commissioner for Behar in 1874) states that from 1 to $1\frac{1}{4}$ lbs. is the ordinary food of an able-bodied person, but that he found from actual sales in the famine that 10 oz. per head per diem was enough, and in future estimates he should reckon 10 seers per month, or $1\frac{1}{2}$ maunds for six months, a sufficient supply. (Reply to Famine Commission.) Mr. Kirkwood writes to the same effect, that $1\frac{1}{2}$ lbs. was an excessive allowance. And Mr. Magrath states that in Madhobani the actual ration given in poor-houses was 1 lb. of rice to an adult, and half to a child.

[3] B. B. I., 230.

[4] *Ib.* I., 241.

[5] On the assumption that from 5 to 10 per cent. of the population of different parts of the district would come on relief.

[6] B. B. III., 268.

and that over 23,000 tons must be imported to feed them. What was the result? The largest number in receipt of direct relief at any one time was[1]—

| | | |
|---|---|---|
| On relief-works in May - - - | 31,029 | |
| On charitable relief in July - - - | 36,180 | |
| | | 67,209 |

The average number relieved daily for seven months was—

| | | |
|---|---|---|
| On relief-works - - - - | 18,230 | |
| Charitable relief - - - - | 14,643 | |
| | | 32,873 |

Besides this, Rs. 1,13,125 was advanced in cash; 4,587 tons of grain were lent and 10,762 sold (a part of which, however, was sold after relief operations were over). Assuming that every 23 seers sold or lent, and every sum of Rs. 1–14 lent, supported one person for a month, the number relieved in this way for seven months was 115,367, making a total of 148,240 in receipt of relief of all kinds; a number a little above the Collector's estimate and far below Sir R. Temple's. When it is considered that many received relief in different forms and are counted twice over in this calculation, and that much of the relief that was given proceeded directly from the largeness of the means of relief provided (the grain having to be disposed of somehow), the logical conclusion seems to be that the Collector's estimate of the real wants of his district was as much above the mark as it was held to be below it.

46. *Amount required by increased estimates.*—On the 27th February[2] the Local Government represented that the following allotments, made in accordance with Sir R. Temple's minutes and requirements, had almost swallowed up the 340,000 tons provided, and that it was necessary to arrange for a reserve—

| | Tons. |
|---|---|
| Tirhut - - - - - | 148,000 |
| Champáran - - - - | 37,000 |
| Saran - - - - - | 18,500 |
| South Behar and Soane Canal - - | 18,500 |
| Bhagalpur - - - - | 25,900 |
| Monghyr - - - - - | 11,000 |
| Purneah - - - - - | 18,500 |
| Rajshahai Division - - - - | 55,500 |
| Total - | 332,900 |

In some of these districts the requirements might be fixed still higher before Sir R. Temple finished his tour; and besides these there was cause for anxiety about the drain on Eastern and Central Bengal, in which parts prices were rising. The Viceroy replied[3] that he had made the necessary arrangements, and from a despatch of March 20th it appears that altogether 465,000 tons had been arranged for, of which 385,500 tons were to come from beyond sea, and 160,000 tons had already arrived. This increase in the quantity purchased, it is explained, was mainly due to Sir R. Temple's calculation that 1½ lbs. and not 1 lb. should be taken as the average daily consumption. Of the whole sum provided (which is put elsewhere[4] as 453,000 tons, independent of purchases by Rajas, Zemindars, &c., with funds advanced by Government) 280,000 tons had been ordered from Burma.

47. *Lord Salisbury finds the increased estimates too low.*—On the 19th March[5] a despatch was written by the Secretary of State urging a large provision of grain. He referred to a telegram of March 4th, which ran—

* * * "'The area of probable severe distress now well ascertained comprises parts of districts of Tirhut, Sarun, Chumparun, Bhagulpore, Purneah, Dinagepore. Expect at the worst period to have something under three million persons on the hands of Government in these districts for three months, from end of May to end of August, a smaller number during April, May, and September, and still fewer in March, October, and November. There will be distress in nine other districts, but it will not be general. Orders of Government rice amount to 420,000 tons, of which 350,000 from beyond sea.'

"Para. 5. The best authorities appear to agree with Sir Richard Temple in fixing the average ration necessary for the support of persons under relief at three-quarters of a seer of rice a day. According to the estimate contained in your telegram you would therefore require for the three months of severest pressure a total quantity of 185,000 tons. If three-quarters of this pressure be assumed for the three months which you place next in severity, and half this pressure for the three months of lightest scarcity, the total amount of rice required, supposing that you have provided no other grain,

[1] MacD., p. 207. [2] B. B. I., 293. [3] *Ib.* I., 315. [4] *Ib.* I., 322 (April 2nd). [5] *Ib.* I., 355.

will be 413,000 tons. Sir Richard Temple, in his minute of the 31st January, upon the distress in Tirhut (see page 224), states that in most parts of Mudhobunnee, and in some parts of Durbhanga, the distress will not disappear at the earliest till December; and in these two districts alone he calculates that it will fall to the Government to support more than 800,000 persons. It will not be safe, therefore, to assume for the closing months of the distress less than half the pressure of the famine at its height.

"6. If these conclusions are a just inference from the figures with which you have furnished me, it results that you have a supply of 420,000 tons of rice to meet a demand which you estimate at 413,000 tons. But this is the demand of the six most afflicted districts only. You observe that there will be partial distress in nine other districts. Sir Richard Temple apprehends (5th February) that half a million distressed persons from Nepal may come to the relief-works and the rice stores of your Government. Moreover 720 tons a week are destined (14th February) for Gya, Arrah, and the Soane Canal; 25,000 tons have been allotted (12th February) to the districts Rajshahye other than Dinagepore, and the Lieutenant-Governor is anxious to retain 20,000 tons reserve to meet the probable want of Eastern Bengal. I observe also that Government grain is being stored in Chota Nagpore and that relief-works have been commenced in Burdwan, and that severe distress is reported to exist among the Sonthals. It is obvious, moreover, that, as prices advance, the distribution of Government grain cannot be confined to those who are 'on our hands,' that is to say, who are in the receipt of the wages or the alms of Government. There will be numbers who have money, or can procure enough to enable them to work on their own land, if only they can turn that money into grain at a reasonable rate, and against these the Government cannot safely close its stores. * * *

"7. Even, therefore, if no disturbing cause should derange your calculations, and if I may assume, from your silence as to provision of any other grain, that you do not in them rely upon any such provision, it seems probable that 420,000 tons will fall considerably short of the quantity required. But with the starvation of multitudes as the possible penalty of a mistake, I am convinced that you will not trust to any exact calculation. There are numerous contingencies which may diminish your supply, or may increase the demand upon you. A liberal allowance must be made for the possible failure of the arrivals on which you count, for the shrinkage of transport, for the chance of accident, for the loss that may result by the damage of rice by rain, for the mistakes of those who act under you. On the other hand, it may possibly be that the calculation on which you are relying will fall short of the truth. The area or the duration of the distress with which it is your duty to deal may be larger than you anticipate. Past experience will not lead you to place unbounded trust on the estimates that are supplied to you.

"These inadequate appreciations led you in November last confidently to name 2,500,000 as the number to be relieved. In March you raised that estimate under the guidance of fuller information to 3,000,000. It is impossible to assume with certainty that the tendency to an inadequate appreciation of the danger, which you have already noted in some of your local officers, has altogether ceased to operate.

"8. These considerations lead me to apprehend that your supplies, as hitherto reported to me, are not sufficient to protect you against the possibility of a serious deficiency. They may be adequate if the most favourable anticipations should be justified by the event, but if any unforeseen aggravation of your difficulties were to occur, your Government might be involved in embarrassment of the greatest character. * * * * I have no wish to limit your discretion as to the mode of providing the requisite supplies, but I request you to take early measures for securing not only the quantity indicated by your present calculations, but also a very ample margin to meet contingencies, the exact nature of which it is impossible to foresee, but which in an emergency of this magnitude are in some form or other likely to occur."

48. *Government of India refuses to raise its estimates.*—The Government of India replied[1] on the 24th April, stating what had been decided on up to date. Sir R. Temple in his minute of 28th March had given a summary of his estimates of the area and requirements of the distressed tract—

| Division. | Distressed Area. | | Population likely to come on relief at worst time. | Percentage to distressed Population. | Percentage to Total Population. | Grain allotted. |
|---|---|---|---|---|---|---|
| | Square Miles. | Population. | | | | |
| | | | | | | Total. |
| Patna - - - | 16,666 | 8,124,164 | 1,794,000 | 22·08 | 13·67 | 241,000 |
| Bhagalpur - - | 7,623 | 2,957,607 | 746,650 | 25·24 | 11·29 | 70,000 |
| Rajshahai - - | 8,098 | 3,491,936 | 802,863 | 20·87 | 8·2 | 77,000 |
| Total - - | 32,387 | 14,573,707 | 3,343,513 | — | — | 388,000 |

Besides this, about 9,500 tons more had been allotted to Hazaribagh, making a total of 397,500 tons allotted, of which 50,000 were intended for a reserve. The Government

[1] B. B. I., 358.

had, however, purchased or ordered 490,000[1] tons, making a reserve of 142,500 tons.

They went on to explain that the number of persons expected to be on the hands of Government included the classes of whom the Secretary of State had spoken, whose needs would be satisfied with permission to buy the Government grain; that though their estimate of the number to be relieved, at the worst time, had risen from two and a half to three and a half millions, they expected that the numbers would be very much smaller during a considerable part of the seven months period; and that in fact in April, the second month of the seven, the number on relief was 1,200,000, or about half the estimate, and the issues of grain from Government stores had been as yet inconsiderable. On the whole, therefore, the Government of India declined to increase its purchases.

49. *Account of Burma purchases.*—On the 9th July,[2] the Chief Commissioner of Burma (Sir A. Eden) having completed the duty entrusted to him of purchasing grain for Bengal, reported on the whole history of the transaction. The exports from Burma in previous years had been—

| | Tons. |
|---|---|
| 1870 | 364,555 |
| 1871 | 477,984 |
| 1872 | 660,435 |
| 1873 | 604,325 |

The crop of 1873, to come to market in 1874, was an unusually fine one, and was estimated at 750,000 tons for export; of this, about 100,000 tons is usually taken for China and the eastern parts, and tonnage had been taken up to carry 400,000 tons to those countries and to Europe. This left 350,000 tons available for purchase by Government. Altogether 289,534 tons were purchased and shipped. This was done through the agency of two local firms whose business it was to purchase the rice on Government account at market rates (subject to constant communication with the Chief Commissioner), to prepare it for export by husking and cleaning, to pack it in gunny bags and place it on board ship at the port of despatch: for this they received a commission of 3 per cent. on their outlay. In January and February the shipments averaged 1,000 tons a day, in March they reached 3,000, in April and May they averaged 2,000. On one occasion a steamer of 1,700 tons loaded in 26 hours. The average cost of all the rice from first to last, when placed on board ship, *i.e.*, "free on board," was Rs. 2–10–11 per maund; it was cheapest between the 15th January and the 6th March, at which time the heaviest purchases were made. The freight from Rangoon to Calcutta varied from Rs. 10 to Rs. 14 per ton.

50. *Further Demands from Bardwan in September.*—On the 19th September,[3] Sir R. Temple reviewed the condition of things in Hughli and Bardwan, in which Districts the holding off of the rains had brought up the numbers largely. There were then 75,000 people on relief in Bardwan and 45,000 people in Hughli, almost all on charitable relief, and it was admitted that they were in good case, that the pressure had been very slight, and that many people had learnt the arts of imposture. Accordingly, it was intended to administer relief with greater strictness, and it was hoped that the numbers would fall by one-third in October, by a half in November, and by three-fourths in December. It was calculated that about 4,000 tons would be required to

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[1] This grain was obtained from the following quarters (I., 375):—

| | | Tons. |
|---|---|---|
| By Government of India, from | Burma | 290,000 |
| | Madras | 41,804 |
| | Saigon | 55,000 |
| | Chittagong | 12,420 |
| | Miscellaneous | 593 |
| | Total | 399,817 |
| By Government of Bengal, from Bengal, Orissa, North-Western Provinces, and Central Provinces | | 69,570 |
| By Government of Bengal, sanctioned purchase from North-Western Provinces if required | | 9,338 |
| By Hatwa and Bettia estates | | 11,030 |
| | Total | 89,938 |
| | Grand Total | 489,755 |

of which 1,000 tons had been sold to Nepal.

[2] B. B, II, 30. [3] *Ib.* II, 48.

feed the numbers thus estimated, and though admitting that the habit of importation existed, and that the advantages of trade and communication were first-rate, Sir R. Temple proposed to draw this grain from the Government reserve in Calcutta, instead of buying it locally. The Government of India, however, refused this application, and directed that purchases should be made in the local markets. "His Excellency in "Council considers it of minor importance that some surplus stock should be left upon "the hands of Government; it was always contemplated that this would be the case."[1]

51. *Stocktaking of Surplus Grain.*—On the 15th September,[2] stock was taken of the Government grain in store, and it was found to amount to 90,000 tons.[3] Of this, it was estimated that about 23,000 tons would be used before the relief operations ceased; some 28,000 tons were scattered about the distressed districts in hundreds of petty granaries, this was to be sold locally to the best advantage; the remainder, 39,000 tons, was collected in considerable quantities in large depôts, and this the District officers were directed to sell, from time to time, between October and March. It was hoped that this grain would realise Rs. $1\frac{1}{4}$ to $1\frac{3}{4}$ per maund.[4] These stocks were independent of the Government reserve of grain in Calcutta, which also was advertised[5] for sale on different days during November, December, January, and which amounted in all to a little over 20,000 tons (595,000 maunds exactly).

52. *Summing-up of the Story.*—In his final minute,[6] Sir R. Temple computes that altogether 460,000 tons of Government grain were imported into the famine tract (exclusive of the reserve in Calcutta), of which about 105,000 would be unexpended at the end of October. The total expenditure[7] up to the first week of October had been 343,000 and possibly 15,000 tons more might be required. The surplus was about 85,000,[8] or including the Calcutta reserve 105,000 tons; this amounts to about 20 per cent. on the total provision of Government grain. This surplus was estimated to bring in Rs. 37,00,000, or Rs. 35–4 a ton, about a quarter of what the grain cost the Government.

"If all the circumstances are considered, if all the necessities to be met are borne in mind, the surplus will not appear excessive. At two very critical periods the Government were not without grounds for fearing that the total provision of grain might not suffice. Towards the end of May there was hardly a responsible officer in the very distressed Districts who considered that the provision of grain for his district or sub-division was too large; and there were many who thought their provision would not suffice. During the last days of August again, and the first days of September, there was a very general belief that the supplies of grain then in store would be inadequate, and that fresh Government importations would have to be begun.

"In previous Indian famines, the months of September, October, and November, have been marked by very high prices and by some misery and even mortality. Experience, therefore, warned us to guard against such contingencies. The unusual breadth, and the generally abundant produce of the early autumn crops of 1874, constituted, as above observed, the main cause of the cessation of the demand for Government grain about the end of September or the beginning of October. Another cause, as already seen, was the relief given so constantly throughout the summer months helped to enable the people to support themselves six weeks earlier than was expected in February 1874."

53. *Cost of the Grain.*—The purchase[9] of this grain (480,000 tons) is stated to have cost 440 lakhs of rupees or Rs. $91\frac{2}{3}$ per ton, or $12\frac{1}{4}$ seers per rupee, or Rs. 3-5-11 per maund. The Burmese rice, 290,000 tons, cost only Rs. 2–10–11 per maund at the port of export, or 213 lakhs in all; so that the remaining 190,000 tons must have cost 227 lakhs of rupees, or Rs. 120 per ton, or $9\frac{1}{3}$ seers per rupee. Possibly, however, the freight to Calcutta of the Burmese rice, which was more than 30 lakhs of rupees, is here included in the cost price. Including the cost of transport, the total sum spent on the purchase and delivery of these 480,000 tons was Rs. 6,47,40,000, or Rs. 135 per ton,[10] or $8\frac{1}{3}$ seers per rupee. The cost of transport was about Rs. 42 per ton, or almost 50 per cent. of the cost of purchase. These figures agree closely with Mr. Bernard's estimate of February 13th, according to which 340,000 tons would cost three millions sterling, and transport would cost Rs. $42\frac{1}{2}$ per ton.

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[1] B. B. II., 50. [2] *Ib.* II., 53.

[3] Afterwards stated as 100,188 tons, in Sir R. Temple's final minute. See B. B. II, 109.

[4] The author of the Black Pamphlet says that much of this grain was sold at from 30 to 50 seers per rupee, and that some was taken down by the purchasers to Calcutta and sold at a profit there. Mr. Lewis, who was Magistrate-Collector of Dinajpur in 1874, says that the Burma rice could hardly be got rid of at 4 annas per maund.

[5] B. B. II., 55. [6] *Ib.* II., 98. (T.) [7] *Ib.* II., 109. (T.)

[8] Apparently this leaves 17,000 tons to be accounted for by "shrinkage." [9] *Ib.* II., 110. (T.)

[10] Colonle Burn states (Reply to Famine Commission) that his importations on behalf of the Darbhangs Raj cost Rs. 205 per ton, so that Government worked cheaper than he did.

## Sale of Grain to the Public.

54. *First Suggestion in December.*—The first attack on the principle that the Government grain was only to be given to labourers on relief-works, was made by Mr. Robinson, the Relief Commissioner of Rajshahai, who reported[1] on the 2nd December that in a large part of Dinajpur the stocks were small; there were no traders who could import from a distance; and there would be a great want of rice in a couple of months; he, therefore, recommended that Government should import largely to a central depôt, and sell at the market rate or slightly under it to petty dealers, village headmen, &c., who would themselves carry the grain to the villages and distribute it to their families, dependants, and others. The Government of India replied[2] (January 12th) that, although this proposal was not "in principle opposed to "the policy of Government in exceptional localities, there was not sufficient evidence "to show the expediency of carrying it out in the District concerned;" they doubted the non-existence of capable traders, and they considered that the Zemindars ought to be stimulated to take advances in order to do this work.

"But it should be understood publicly that the stores of Government grain are either for relief-works or for relief committees, and for no other purpose, so that any discouragement may be avoided as regards any local trade which may exist or may yet spring up."

In[3] the conference held on January 8th, the Viceroy thus expressed his views on the subject:—

"He thought it most essential that no idea should get abroad that Government was going to open stores and take upon itself the task of feeding the whole population. All the Government could do would be to supplement the action of private trade. This could not be too distinctly understood. But in special limited Districts, where from one cause or another private trade might be found not to bring in supplies, Government might, he thought, properly sell grain at its price at the nearest large grain mart, with the addition of something for carriage, as was done in the Irish famine. The sale of Government grain in this manner would continue until the supply brought in by private trade was found sufficient to meet the wants of the people. It would then at once be discontinued, and the grain in Government stores would be devoted to its legitimate object, namely, the supply of food to people engaged on Government relief-works, and the distribution through the relief committees of gratuitous relief to that limited portion of the population who stood in absolute need of it."

55. *Sale permitted under conditions.*—On the 26th January, the rules[4] issued for the guidance of the local Relief Committees permitted them to sell grain below the market rates, or to advance it as a loan to people whose caste usages and feelings preclude the application of a labour test, and who are in great distress; or, if a serious deficiency of grain is apprehended, they might arrange to sell grain to local traders, fixing the price according to that of the nearest market plus cost of transport; such sales to be stopped as soon as local trade receives sufficient supplies.

56. *Probability of more general sale considered.*—In the estimate framed[5] on 13th February, in which allowance is made for the purchase of 340,000 tons of grain, it is admitted that the stock thus laid in is very much in excess of the probable requirement of relief labour alone.

"It is quite clear that labourers on Government works alone will not be numerous enough to consume more than a small proportion of the Government provision of grain. There will, therefore, be a good deal of grain available for sale for those who can buy in parts where private trade does not supply the markets, over and above what may be required for charitable distribution. Some of the grain will, perhaps, be left unspent at the end of the famine, if happily Behar and Bengal have a good summer crop. Reckoning on a fair summer crop, Government may, perhaps, estimate the proceeds from sale of grain, and from the yield of surplus stores at the end of the famine, to approach a crore."

57. *Conditions further relaxed.*—In the end of January Mr. Robinson again brought forward his proposal to sell Government grain in Dinajpur to the public.[6] He argued that with the prices then current at Calcutta, it could not pay any trader to bring up grain to sell in Dinajpur at 10 seers per rupee; especially as no habit of importing exists and "trade connexions are not formed in a month or two." "There is some "money in the country, and very little grain; if the people can get rice within a "reasonable distance at a fair price, they will go and buy it and take it themselves "to their home (or to neighbouring markets if petty dealers) and so supply places "difficult of access. If Government does not do this, it may have to feed at least 70 or "80 per cent. of the population, whereas if rice is sold, I firmly believe that 50 or 60 "per cent. would provide for themselves." He urged that as an experiment Government should allow one Relief Committee to sell 10,000 maunds in February at the rate of 10 seers per rupee, selling not more than 50 maunds, and not less than one bag to any one person. In reply to this, the Government of Bengal on the 18th February

[1] B. B. I., 181. [2] *Ib.* I., 188. [3] *Ib.* I., 165.
[4] *Ib.* I. 400. [5] *Ib.* I., 235. [6] *Ib.* I., 244–250.

(with the sanction of the Supreme Government) permitted the sale of grain wholesale (leaving it to the people themselves to distribute it retail) as an exceptional case under two conditions: (1.) That Government has large enough stores to do this without stinting its relief-works and poor-houses; (2.) That there is an absolute dearth of grain in the country, and a want of trade at the chief marts, but a sufficiency of local trade and local activity to distribute the supplies sold by Government. Care must, however, be taken that the food grain does not fall into the hands of monopolists who will hoard it up for their own profit. The quantities thus sold may vary from 20 seers to 10 or 20 maunds as a rule. The difference between these sales and those sanctioned by the rules of Relief Committees would be that in this case the sales would take place at large central marts, in the other, the grain sold has been brought by Government close to the people's doors as a provision for a relief circle of very moderate area.

58. *Sales made general.*—In March[1] authority was given to sell grain to the public in specified parts of east and north-east Tirhut, in north-west Champáran, in north Bhagalpur, and in parts of Purneah, Dinajpur, and Rungpur, at the rate of 10 seers per rupee, subsequently lowered to 12 seers in April.[2] But during all April less than 10,000 tons were sold.[3] Private persons were allowed to purchase direct from the Government granaries; but generally[4] grain was sold to dealers for retail distribution to the public, and when sold wholesale the rate was slightly reduced. In May the area in which such sale was permitted comprised nearly the whole of the districts named above, as well as Malda and Bogra; besides smaller parts of the other "partly distressed" districts. "It was "never authorized in south Tirhut, Shahabad,[5] Bardwan, Birbhum, Hazaribagh, Patna, or "in some parts of Saran, Purneah, Dinajpur and Rangpur. On the whole, it was autho- "rized in about one-third of the area of the distressed districts, not in the remaining two- "thirds. Up to June 10th, the sales to the public amounted to 47,389 tons."[6]

59. *Amount sold.*—The quantity of grain sold after this date is as follows:—[7]

| | Tons. |
|---|---|
| Sold up to 10th July - - - - | 74,836 |
| „ „ August - - - - | 95,858 |
| „ „ September - - - | 116,941 |
| „ „ 1st October - - - - | 118,107 |

This accounts for grain sold to the public or to labourers, and does not include grain given to labourers in lieu of wages. In August and September the prices were lowered to 13 and 14 seers per rupee, and the final sales must have been at lower rates than these.[8] The price obtained by these sales is stated[9] to have been 95 lakhs of rupees or Rs. 80·8 per ton, or $13\frac{9}{10}$ seers per rupee.

## Private Trade.

60. *Extent of its activity.*—The degree of activity of private trade inland (*i.e.*, at a distance from the railway) is somewhat disputed, as has been seen by the conflicting quotations given above; but there is no question that it was extremely brisk along the line of the Railway. At one time, 50,000 tons a month were being brought in from the North-Western Provinces alone to Patna, and the following is Sir R. Temple's estimate[10] of the total imports from October 1873 to October 1874:—

| | Tons. |
|---|---|
| By Railway— | |
| From Bengal upward to Behar - - - | 157,226 |
| From Northern and Central India to Behar[11] - | 225,952 |
| By River— | |
| From Bengal to Behar - - - - | 44,886 |
| By River and Road— | |
| From Eastern Bengal into Northern Bengal - | 101,000 |
| Total - - - | 529,064 |

[1] B. B. II., 84. (T.)

[2] It was reckoned that the grain as delivered in local granaries cost nearly $8\frac{1}{2}$ seers per rupee or 8 seers of *clean* grain.

[3] *Ib.* II., 84. (T.) [4] *Ib.* II., 96. (T.)

[5] It was however sold in the District to the extent of three-fourths of the import. (MacD. p. 38.)

[6] *Ib.* II., 97. (T.) [7] *Ib.* II., 106. (T.)

[8] Mr. Kirkwood states that in Bhagalpur in July the price of Burma rice was lowered to 16 seers per rupee for the public generally, and 20 seers per rupee for the traders.

[9] B. B. II., 110. (T.) But Colonel Burn, Manager of the Darbhanga Estate, sold at Rs. 98 per ton to his ryots.

[10] *Ib.* II., 97. (T.)

[11] This was afterwards calculated to have amounted to 289,000 tons. See Resolution of 18th February 1875 (II., 64).

So rapidly were these stores disposed of and dispersed that when the Commissioner of Patna made enquiries with the view of purchasing locally for Government in that market, he found very little stock in hand, and was convinced that any intervention of the kind would greatly affect and paralyse the trade.[1]

"This large total shows that private trade has been active beyond the anticipations of most people, and has fully justified the confidence placed by the Government of India at the beginning of the affair in the resources and enterprise of private dealers. It has been already explained that prices were everywhere so high that private traders could not afford to carry grain by long land journey to markets far from the railways or great rivers; and that consequently private importation scarcely penetrated to the most remote and distressed parts of North Behar and Northern Bengal. But the private importation, as just shown, fully supplied the broad and densely-peopled tract near the railways, and left the Government free to concentrate its supplies and resources mainly on the most distressed tracts."

It can hardly be questioned, after a consideration of these facts, that there was no necessity for importing Government grain into the districts which lie on the Railway, such as Shahabad, Monghyr, Bhagalpur, Bardwan, &c., and there are many others off the line in which trade was active. In Saran the traffic registration shows an import of 65,000 tons, and in March it was officially reported that the bazaars were abundantly supplied with grain; in Champáran private trade was active throughout, as the District lies, for its whole length, along the bank of the Gandak, a stream navigable at all times of the year: even into Darbhanga, according to Mr. Mac Donnell's estimate, 30,000 tons were imported by merchants. Purneah has already been mentioned. And while it is conceded that in the extreme north of Behar trade did very little or nothing towards importing grain it must be remembered that it could not have done this if it had been ever so actively inclined, since Government had taken up all the transport of the country.

In his final minute Sir R. Temple speaks[2] thus of the cessation of private trade in North Behar—

"During all May and the first week of June there was hardly any rice and very little food-grain of other kinds in the markets of the interior of North Behar and North Bengal. In these tracts the petty retail dealers found their occupation gone, and were glad to act as agents for the distribution of Government rice by sale among the people. The strange spectacle was presented of a whole class of native traders being converted into a Government agency.

"When the rains set in after the first week of June some private stocks were brought out. Of these, a part belonged to individual zemindars and others, and was used for the payment of wages of agricultural labour; a part belonged to traders and was sold in the market. Such sales were, however, comparatively insignificant. After a time they ceased. The markets became quite empty again, and remained so until the new grain of the August and September crops came in."

## Relief-works.

61. *Rates of wages.*—In the early part of the famine administration the relief-works were carried on on the system of paying daily wages and exacting a sufficient task in return, and the rule was that the ordinary rate of wages should be paid. At this rate an adult male labourer received 2½ to 3 annas a day in Rangpur, and from 1¼ to 1½ annas in Champáran.[3] In Dinajpur[4] it was 2½ annas for men, and 2 to 1½ and 1 anna for boys. In February the Central Relief Committee[5] made a representation to the effect that wages ought not to be fixed at too attractive a rate, and should bear a close relation to the price at which food could be bought. Sir G. Campbell agreed that relief wages should never suffice for more than a mere maintenance, and should have reference to the price of food. But no definite rule could be laid down till it was ascertained whether it was the habit of the district for women and children to work; and when food was extraordinarily dear near any relief-works, wages should not be raised to an exorbitant rate, to enable labourers to buy, but food should be supplied at reasonable rates. It does not appear, however, that any fixed scale of relief wages or any sliding scale following the movement of prices was laid down by the Government of Bengal either for any district or for the whole famine tract.

62. *Women at work.*—The question whether it was the habit for women to work on the roads in Behar was settled by Sir G. Campbell's visit in March.[6] He passed through crowds of tens of thousands of women employed on relief-works without a complaint being made on the score of caste. He considered it indeed a proof of hard times that these women came to the works, but saw no symptoms that want had driven the better classes to great extremities.

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[1] B.B. II., 97, 98. (T.) [2] *Ib.* II., 106. (T.) [3] *Ib.* I., 104.
[4] *Ib.* I., 186. [5] *Ib.* I., 257–8.
[6] B. B. I., 304 (March 18th). This was written in reference to a sensational telegram to an English newspaper about "hundreds of high-caste women to be seen labouring in the Government relief-works."

63. *Classification of workers.*—In his minute of March 28th, Sir G. Campbell remarked[1] that the in-rush of large numbers had been such that the local organization was unable to prevent great abuses. "Women and children came on the works quite as readily as men, and it is because the whole family work or pretend to work that somewhat low wages[2] with dear food are not incompatible with an almost liberal measure of relief, measured by the fare to which the people are accustomed." But it was essential to put an end to this demoralizing state of things, for "when under pressure of such a necessity "a lax system is established, and every one down to the smallest child gets paid for the "merest pretence of work (with probably a good many abuses besides), the thing becomes "too attractive; the whole country tends to come on the works; the numbers threaten to "be absolutely overwhelming." His system was to divide the works into two classes, the one under Public Works Department or other competent officers, on which real labour is exacted and full wages paid, the other under circle officers, where the labour is less effective and the rates of wages are mere subsistence rates, or else easy piece work is given for liberal terms. *Primâ facie*, daily payments are best, but with such large numbers either payments must be made only to heads of gangs, which opens a field for cheating, or else, which is better, the labourers should be paid every second or third day.

64. *Relation of Public Works Department with Civil Department.*—With regard to the responsibility of the management of large relief-works, he says[3]—

"It is to be thoroughly understood that not only are the officers of the Public Works Department employed in districts where scarcity prevails, wholly and absolutely under the Commissioners and superior Civil officers of Districts on all points in which they may think it desirable to interfere, but that everywhere the local sub-divisional officers and their assistants are directly responsible to see that payments are properly made and work given in the manner most conducive to relief * * * The Public Works officers will ordinarily arrange for payment of the men employed under them, but the local Civil officers will inspect the works, test the payments of the Public Works subordinates, and see that all is right. If not right, they will at once communicate with the Public Works officers, and if necessary with their own official superiors."

The following is an instance of the vigorous measures taken to ensure that the Public Works Department officers should learn the difference between the system to be pursued on relief-works and that of ordinary years. The Executive Engineer of Tirhut having made no provision for frequent payments, and it being shown that on some of his works the coolies had received no wages for fifteen days, he was severely censured and removed from his appointment.[4]

"The Lieutenant-Governor is of opinion that the maladministration in this matter was most serious, for he thinks that it is to the delay in making the works acceptable, popular, and sufficient as relief-works, that the fact of the famine having gained on us in Tirhoot is mainly due. It is clear that sufficient work was not offered on sufficiently attractive terms, in proportion to the prevailing distress during the early stages of the scarcity in that district. Considering the very decided and clear terms of the orders issued by the Government on the 29th October 1873 and subsequently, both by the Government and by the Commissioner, the Lieutenant-Governor cannot but regard Mr. Urquhart's conduct as wholly inexcusable."

65. *Task enforced.*—Regarding the means to be adopted to make the labourers turn out a fair amount of work, he wrote:—[5]

"To the distressed poor of both sexes the task-work system" (which term as is shewn by comparison with other passages is here used to mean the same thing as the piece-work system) "cannot be generally applied. As much work must be obtained for them as they can fairly do, and no more. Any stringent enforcement of a labour test may repel these people and cause ultimate danger to life. But it is better to obtain a little, even the smallest amount of work, from those who can work, than to give gratuitous relief. The offering of piece work is very good whenever the people will accept it, the terms offered being, as has been said, liberal."

66. *Rates relaxed.*—The effect of this attempt to introduce discipline and to obtain a fair return for wages was at first very discouraging. Writing on the 1st May, the Government of India report[6]:—"The local officers received instructions to divide the "relief-works into two classes, one for the able-bodied, where real labour by piece-work "would be exacted and full wages paid, the other for less effective labour, or easy piece-"work, requiring no professional supervision, and remunerated by mere subsistence "rates." On this system being suddenly introduced, about 350,000[7] labourers left the works in one day. A few came back immediately afterwards: a large number were drafted to village works under the circle officers; many who were not fit for any save nominal work were admitted to the lists of charitable relief. But still Sir R. Temple found[8] that "numbers, estimated at 80,000 to 100,000, had remained out of employ for

[1] B. B. I, 326.

[2] Low as they were, they left a margin for charity, since Sir G. Campbell saw two or three Fakirs living on the charity of a relief gang.

[3] *Ib.* I, 328. [4] *Ib.* I, 347.

[5] *Ib.* I, 329. [6] *Ib.* I, 372. [7] *Ib.* II, 94. (T.) [8] *Ib.* III, 155.

" several days, subsisting on the little savings from their earnings on the daily wage " system, but verging nearer and nearer towards the extremity of destitution." Hence, though the terms proposed had not been really hard, Sir R. Temple immediately offered[1] " new terms, much more liberal, indeed as liberal as could properly be offered"; and these speedily attracted large numbers back to the works. What the rates of payment were which were offered in the first case and afterwards relaxed is nowhere stated; but in the next fortnightly report (1st to the 4th May) Mr. Metcalfe gives the following description[2] of the system.

"On every tank labourers have been given distinctly to understand that they were at perfect liberty to work either at task-work or at daily labour. The allowance for daily labour has been so proportioned that it is just sufficient to subsist on with some degree of comfort. On the other hand, the reward for task-work has been extremely liberal: this holds out an inducement to those who are willing to work and able to work, to earn a fair day's pay for a fair day's work. It has always been possible for a man to make his four annas a day at task-work. This, with rice at one kutcha seer for the anna, is very high pay indeed for one who is not a professional coolie. The consequence of this system is that those who are weak and unable to do much work find such light work to do on the tank as they are capable of doing, and for this daily labour obtain enough food to last for the day. On the other hand, all the able-bodied men take piece-work, and are the real effective coolies on the tank."

67. *The piece-work system.*—In the next report[3] Sir R. Temple enters fully into the subject of these rates: at this time (the end of May) there were 1,450,000 people on the works, of whom not more than 180,000 were on daily wage, the rest being on piece-work or task-work. The daily wages given are $1\frac{1}{2}$ annas[4] in Tirhut, and $2\frac{1}{2}$ annas in the eastern districts for men: which is only enough to afford "a meagre and jejune sub- " sistence." On task-work "the wages are kept low, hardly higher than the daily wages " above described, and as a day's work is exacted, these people are working for what is " a stinted subsistence relatively to the high prices of the day. For the piece-work the " rates now allowed do appear more liberal for the skilled and industrious, especially in " Eastern Tirhut where the last rate is from 5 to 6 annas[5] per 100 cubic feet. But they " were framed in order to suit those large numbers who, originally of a poor physique, " had been recently lowered in condition. The pressure so to speak had to be re- " gulated according to the weakest part of the beam."[6] "Being anxious, however, that " the State charity should be administered with as much thrift as possible," he had authorised the lowering of the rate to 5 annas, and in some cases to $4\frac{1}{2}$ annas, per 100 cubic feet. It was admitted that with these rates the strong and skilled would make more than a subsistence, but this surplus is being saved up against the time between the closing of the works, due to the rains, and the ripening of the crop. " Those who save " at the present time will not come on our hands when the works are closed." Some people also[7] took advantage of these high rates for piece-work to earn enough for their support in a few hours, and to spend the rest of the day working on their fields. This however could not be helped.

"The piece-work system was seen to be open to one particular objection, in that a practised or professional workman earns more than need be allowed to him as relief. Any terms which are favourable enough for the unskilled or inefficient (who are the great majority) must prove too favourable for the skilled few. It was decided that this objection could not be obviated, and that no exception could be made as against those individuals, especially as their example instructed the mass of the relief-labourers in workmanlike habits."

68. *Effect of small local works.*—The spread of local relief-work all over the country had the usual effect of keeping down the numbers employed on the really useful Public Works which Government was anxious to push on.[8]

"The Gunduk embankment indeed, being very favourably situated in respect to distressed tracts, did attract almost as many labourers as could be advantageously entertained—45,000. But the Soane Canal and the Northern Bengal Railway never received the desired complement. The highest numbers of labourers on these works may be thus stated:—

| | |
|---|---|
| Soane Canal - - - - - - | 41,000 |
| Northern Bengal Railway - - - | 22,000 |

Unsuccessful attempts were made to induce bodies of labourers from Sarun to resort to the Soane Canal, and from the south of the Ganges, Monghyr, and Sonthalia to the Northern Bengal State Railway. Frequent injunctions were sent to the local authorities to send labourers to that railway, but without

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[1] B. B. III, 156. [2] *Ib.* III, 164. [3] *Ib.* III, 177.

[4] The Deputy Collector of Muzaffarpur (Munshi Ishri Pershad) says in his reply to the Famine Commission that on his works in that district two annas were paid to men.

[5] Mr. Kirkwood (Reply to Famine Commission) says that in the north of Bhagalpur the rate in May was six seers of rice (equal to eight annas) per 100 cubic feet.

[6] *Ib.* III, 178.

[7] *Ib.* II, 94. (T.) Some, however, spent their leisure less profitably, doing nothing at home; and they explained to Mr. Oldham (Relief Officer in Champáran) that "they did not care to work every day."

[8] *Ib.* II, 95. (T.)

much result. These numbers would have been greater had there been no other relief-work. Some men who might have been induced to leave their homes and go to a distance for these great works preferred lesser works close at hand. But this objection cannot be obviated, when, from general famine, it has become necessary to spread a relief system over the country. The majority of relief labourers cannot migrate to a distance for a short time; they have their families, their fields, and their concerns at home, all of which will in a very few weeks urgently need their presence. Their time would be lost in going and coming, and unless they receive bounties (which are otherwise objectionable) they could not subsist. For them, therefore, if no works but the great engineering works are open, there will be no relief at all, and they must perish. But if the numerous lesser works are open for them (and they are the vast majority), it is impossible to prevent the few who could migrate from taking advantage of the works near at home. Nor is this wholly disadvantageous. For these are the very men who, having skill, shew the unskilled multitudes how to work, and thus render the relief labour more productive."

69. *Minor relief-works; the duty of landowners.*—With regard to minor relief-works of local and restricted utility, the following was Sir G. Campbell's opinion[1] at the outset of the famine:—

"There has been much complaint of the want of good tanks for drinking water, of petty drainage channels, and such like improvements. There can be no doubt that petty works of this kind are at least as useful as large works, and they certainly bring employment more effectually to the homes of the people. But, on the other hand, it would be impossible for Government to undertake and superintend such works of local improvement on private property. The Lieutenant-Governor has, however, instructed the Commissioner to ascertain whether it might be arranged that private landholders should undertake such works, Government if necessary advancing the money on the security of the estates. He feels sure that if the upper classes feel the duties of their position such an arrangement should be gladly accepted by them, and be very feasible."

70. *Conditions on which Government may assist them.*—It was soon found, however, that the zemindars would not be willing to pay for such improvements as these, even though the money was lent them, and the next relaxation was to promise[2] that "Govern- "ment would be ready to defray a portion, not more than one-third, of the cost of petty "village works executed with Government loans before the end of July 1874, which "directly improve the drinking-water supply of the people, or are shown to be of direct "advantage to the general public." Advances also[3] were to be given for digging wells, (1) to zemindars on the security of their estates, (2) to ryots on the security of zemindars, (3) to ryots on their own security, (4) to ryots on no security at all; "provided the "need is very urgent, and the ryots from the character and position they hold in the "village can be presumed to be men who will honestly repay the money to the best of "their ability."

71. *Conditions under which Government may undertake them altogether.*—To some extent these loans and promises of assistance were taken advantage of by zemindars and others, but the question remained whether, failing this, it was right for Government to expend public money on works situated on, and which would more or less improve, permanently settled estates. The Commissioner of Bhagalpur raised this point, on the 18th January[4] (at a time when in all his Division he had less than 15,000 labourers to employ) by writing "we cannot provide a sufficient number of embanked roads which "can usefully be undertaken. There are plenty of excellent and useful tanks, which "will do much good and will bring the work near to the homes of the people; but there "is little hope of our getting the zemindars to undertake a sufficiency of these works, "either from advances or otherwise." On this Sir G. Campbell wrote that though this was the zemindars' duty, and they ought to be persuaded to fulfil it, still there was risk that "while the work of persuasion was going on, the relief-work may fall short, and "the people be left without work and without wages." It was possible to pass a law making the zemindar liable for a part of such expenditure, but that would take time. On the whole his view was[5] that—

"In some cases when proper public works cannot be found, either the Government or the relief committees must undertake works, which are not public works in the ordinary acceptation of the term, in order to give employment to the people and save the cattle. Unless Government is prepared to legislate, we must confine ourselves to those works which seem most beneficial to the people, and make the best bargain we can with the landholders in each case. In such circumstances Government might undertake works of a large and heavy description or very emergently required to save the country, while petty village works necessary for relief might be undertaken by the relief committees."

To this proposal the Government of India assented (9th February).

72. *Conditions further relaxed.*—On the 28th March, Sir G. Campbell, after his visit to Darbhanga, wrote thus[6] regarding the carrying on of these works—

Para. 19. The village works under circle officers must necessarily be conducted, for the most part, by non-professional people; but I have arranged that in each relief circle an officer should be specially

[1] B. B. I, 6 (Nov. 3rd). [2] *Ib.* I, 54 (Nov. 17th). [3] *Ib.* I, 81 (Nov. 24th).
[4] *Ib.* I, 242. [5] *Ib.* I, 243. [6] *Ib.* I, 328.

charged to look after the works in the circle. There has been much correspondence regarding these village works. The result is that, by aiding zemindars and otherwise, we must promote the employment of the people to the very utmost, but that in the last resort in very distressed tracts, where the people are likely to starve and no one can be induced to undertake works for his own benefit or from public spirit, the Government must employ the people by undertaking such works (excavating tanks and the like) as are most beneficial to the general community. I rely much on the tact and energy of the local officers to make these arrangements for the best. Even when Government pays for the works, they may advantageously be placed under the village headmen and others locally interested; we want to give the people work near their homes, and, if the headmen are interested, they will carry the work out all the more readily."

These works however were not popular:—

Para. 23.—"In many places the labourers dislike tank work and insist on flocking to the roads. We must reduce them to order and discipline, and make them do the work most fitting for them to do; but still it is a great object to maintain large works sufficient for the employment of all the labourers who legitimately seek work and submit to regular discipline, while at the same time the opportunity of permanently benefiting the country should not be neglected."

73. *Numbers on large and small works.*—The respective numbers employed on large and on small works are not given in all the returns; but the following statistics have been collected regarding them from the fortnightly narratives:—

| Periods of time. | Total No. employed. | No. on Village works. |
|---|---|---|
| April 17th to 30th | 1,238,092 | 616,162 |
| May 1st to 14th | 1,373,401 | 699,495 |
| May 29th to June 11th | 1,737,768 | 870,846 |
| June 12th to 25th | 1,770,732 | 1,010,648 |
| June 26th to July 9th | 893,163 | 404,290 |
| July 10th to 23rd | 636,762 | 256,374 |
| July 24th to August 6th | 453,486 | 214,718 |
| August 7th to 20th | 426,738 | 230,167 |
| August 21st to September 3rd | 395,403 | 199,170 |
| September 4th to 17th | 331,982 | 121,912 |

In the Patna Division about half to two-thirds of the relief labourers were employed in the village works; in the Rajshahai Division about three-quarters were so employed, in the Bhagalpur Division about half, and in the Bardwan Division a very small proportion.

74. *Total numbers employed monthly.*—The following statement shows as far as it can be ascertained the average monthly numbers employed on relief-works. The appended statement gives the same information in detail for each district[1]:—

| | | |
|---|---|---|
| November | 1873 | 5,281 |
| December | „ | 49,051 |
| January | 1874 | 113,224 |
| February | „ | 284,690 |
| March | „ | 674,074 |
| April | „ | 1,295,816 |
| May | „ | 1,694,142 |
| June[2] | „ | 1,198,908 |
| July | „ | 632,259 |
| August | „ | 426,077 |
| September | „ | 242,079 |
| Total | | 6,615,601 |

Looking only at the time of greatest pressure, the average number employed daily during the nine months from January to September was 735,067.

[1] The figures for the districts are taken from Mr. MacDonnell's report, those for the three large Public Works Department works from the special narratives; but Mr. MacDonnell's figures are not quite complete, the numbers employed in the Patna District, for instance, not being given.

[2] The sudden fall in this month is very remarkable, and does not agree with the figures given in the preceding paragraph according to which the numbers went on increasing till June 25th, and only began to fall at the end of the month.

## Statement of the Number of People relieved on Works in Bengal during the Famine of 1873–74.

| Districts. | November, 1873. | December. | January, 1874. | February. | March. | April. | May. | June. | July. | August. | September. | Total number relieved. | Average monthly number. | Average cost per head per mensem. | Grain wages. | Cash wages. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| | | | | | | | | | | | | | | R. A. P. | Tons. | Rs. |
| Shahabad | 950 | 2,286 | 2,227 | 2,582 | 3,033 | 6,290 | 10,074 | 6,454 | 4,407 | 4,493 | 2,996 | 45,792 | 4,163 | 5 11 10 | 545 | 1,89,373 |
| Saran | — | — | 20,180 | 87,181 | 106,850 | 166,683 | 197,442 | 223,991 | 140,765 | 110,262 | 101,111 | 1,154,465 | 128,274 | 2 10 2 | 11,487 | 15,06,412 |
| Darbhanga | — | — | 2,500 | 45,000 | 251,402 | 531,578 | 569,402 | 279,943 | 77,615 | 66,408 | 21,682 | 1,845,530 | 205,059 | 2 8 3 | 10,769 | 31,88,829 |
| Muzaffarpur | — | 851 | 973 | 13,692 | 64,841 | 177,238 | 327,248 | 269,177 | 128,778 | 102,183 | 39,654 | 1,124,635 | 112,463 | 2 1 10 | 9,500 | 11,00,685 |
| Champáran | 561 | 4,589 | 11,631 | 25,361 | 52,758 | 83,917 | 159,668 | 79,752 | 73,007 | 8,938 | 1,849 | 502,031 | 45,639 | 3 3 10 | 7,294 | 6,43,808 |
| Gya | — | — | 142 | 454 | 764 | 1,334 | 2,486 | 2,756 | 1,192 | 397 | 383 | 9,908 | 1,101 | 5 11 1 | 117 | 40,648 |
| Bhagalpur | 1,351 | 4,166 | 7,485 | 8,639 | 7,956 | 22,234 | 32,637 | 27,528 | 29,556 | 29,424 | 12,002 | 177,978 | 16,180 | 2 2 6 | 1,474 | 1,85,498 |
| Monghyr | — | 4,210 | 5,227 | 4,240 | 4,460 | 4,631 | 10,596 | 11,148 | 3,912 | 1,972 | 332 | 50,728 | 5,073 | 3 14 7 | 486 | 1,32,993 |
| Santhal Parganas | — | — | 400 | 540 | 2,575 | 12,490 | 24,383 | 27,039 | 18,226 | 11,811 | 6,130 | 103,594 | 11,510 | 4 4 10 | 1,970 | 1,79,959 |
| Purneah | — | 356 | 945 | 3,640 | 10,231 | 20,264 | 31,029 | 28,763 | 21,746 | 9,626 | 1,014 | 127,614 | 12,761 | 7 6 1 | 5,366 | 2,17,584 |
| Dinajpur | 1,800 | 6,055 | 21,179 | 29,696 | 60,516 | 93,208 | 94,797 | 53,259 | 25,742 | 8,653 | 2,543 | 397,448 | 36,132 | 3 14 8 | 2,934 | 11,61,492 |
| Rangpur | — | 59 | 722 | 1,705 | 8,988 | 31,696 | 53,308 | 22,747 | 5,830 | 93 | 7 | 125,155 | 12,515 | 4 9 6 | 922 | 4,50,909 |
| Maldah | — | 426 | 260 | 1,816 | 3,366 | 5,154 | 7,374 | 5,442 | 3,650 | 2,441 | 762 | 30,691 | 3,069 | 4 8 9 | 243 | 1,06,762 |
| Murshidabad | — | 737 | 1,892 | 2,338 | 2,834 | 3,134 | 3,103 | 3,347 | 2,765 | 6,171 | 1,967 | 28,288 | 2,829 | 5 14 0 | 707 | 70,795 |
| Rajshahai | 619 | 713 | 557 | 451 | 3,316 | 2,971 | 2,162 | 1,914 | 979 | 878 | 395 | 14,955 | 1,359 | 5 5 8 | 209 | 51,841 |
| Bogra | — | 45 | 587 | 1,566 | 8,000 | 29,285 | 45,454 | 17,521 | 8,060 | — | — | 110,518 | 12,815 | 3 9 5 | 813 | 2,58,111 |
| Pabna | — | 111 | 229 | 621 | 1,635 | 863 | 2,598 | 2,214 | 1,118 | 252 | 40 | 9,681 | 968 | 3 11 5 | 100 | 22,456 |
| Birbhum | — | — | — | 652 | 2,107 | 3,846 | 8,054 | 10,352 | 6,655 | 7,826 | 5,194 | 44,686 | 5,586 | 4 7 8 | 1,004 | 64,809 |
| Bankura | — | — | — | — | 2,291 | 1,890 | 2,639 | 3,492 | 3,651 | 4,103 | 3,302 | 21,368 | 3,053 | 9 9 0 | 797 | 96,850 |
| Bardwan | — | — | 1,168 | 3,513 | 3,359 | 6,430 | 9,613 | 11,574 | 7,571 | 5,252 | 2,206 | 50,686 | 5,632 | 5 3 4 | 1,495 | 62,277 |
| Nadiya | — | — | — | 1,662 | 2,409 | 1,850 | 2,348 | 4,054 | 5,006 | 4,848 | 2,037 | 24,214 | 3,027 | 8 0 11 | 478 | 1,30,712 |
| Manbhum | — | — | — | 1,371 | 3,215 | 10,002 | 18,917 | 14,259 | 8,211 | 794 | 127 | 51,896 | 6,487 | 6 1 6 | 1,691 | 88,122 |
| Total | 5,281 | 24,604 | 78,304 | 231,720 | 606,906 | 1,216,988 | 1,610,332 | 1,106,726 | 578,442 | 386,825 | 205,733 | 6,051,861 | 635,695 | 2 15 10 | 60,401 | 99,50,925 |
| Soane Canal | — | [1] 23,475 | 32,000 | 34,000 | 30,439 | 36,358 | 41,019 | 33,397 | 27,441 | 26,472 | [2] 26,020 | 310,621 | 31,062 | — | — | — |
| Gandak | — | [1] 972 | 1,620 | 14,370 | 27,224 | 27,024 | 23,964 | 36,410 | 15,450 | 7,386 | [2] 5,942 | 160,362 | 16,036 | — | — | — |
| Northern Bengal Railway | — | — | 1,300 | 4,600 | 9,505 | 15,446 | 18,827 | 22,375 | 10,926 | 5,394 | [2] 4,384 | 92,757 | 10,306 | — | — | — |
| Total | — | [1] 24,447 | 34,920 | 52,970 | 67,168 | 78,828 | 83,810 | 92,182 | 53,817 | 39,252 | [2] 36,346 | 563,740 | 57,404 | — | — | — |
| Grand Total | 5,281 | 49,051 | 113,224 | 284,690 | 674,074 | 1,295,816 | 1,694,142 | 1,198,908 | 632,259 | 426,077 | 242,079 | 6,615,601 | 693,099 | — | 60,401 | 1,28,40,000 |

[1] From 13th December only.

[2] First fortnight only; all strictly relief-works closed.

75. *Cost of relief-works.*—Up to the middle of April the labourers were generally paid in cash, and 31 lakhs of rupees were disbursed in wages[1] before the 15th of that month. After that date the system of paying in grain was introduced, either by issuing food grain, or establishing a shop close to the works and paying the labourers in money, and leaving them to buy grain at the shop or at the nearest Government granary. The total cost was reckoned by Sir R. Temple as Rs. 1,28,40,000 in cash and Rs. 46,90,000 in grain; but this sum apparently is got by taking the ton of grain as worth about Rs. 75. Taking it at Rs. 135, the cost of the 60,401 tons disbursed as wages (see column 16 of preceding statement) in certain districts alone was Rs. 81,54,000. There was besides the value of the grain disbursed on the great Public Works, which is not recorded. Putting this aside, the total cost of relief-works was Rs. 2,10,00,000, and the average payment per head per month Rs. 2–15–10, or say Rs. 3. But in several districts it exceeded Rs. 5, and in Purnea it was as high as Rs. 7–6 per head. Of the expenditure, 37 per cent., or about Rs. 77,00,000, was expended on tanks, and 63 per cent., or Rs. 1,33,00,000, on roads of which the value (at the labour rates of ordinary years) was estimated as Rs. 55,00,000.

76. *Result of works carried out.*—The result[2] of the relief-works was that in the country north of the Ganges about 4,000 miles of old and new roads had been set in order or made, and besides these about 2,600 miles of road had been made or repaired in the Bhagalpur, Rajshahhai, and Bardwan Divisions, making 6,600 miles altogether. It was estimated that an expenditure of about 14 lakhs more was required to bridge these roads, and put them in working order.

### Principles of administering Gratuitous Relief.

77. *Earliest views as to tests.*—The earliest views expressed on the subject of administering gratuitous relief were in accordance with those which had been followed in previous famines. In his letter of January 10th,[3] instructing district officers that the time had come to make definite arrangements for the constitution of Relief Committees and for setting them to work, Sir G. Campbell said: "Everywhere care will be taken "that relief is not given without work, when work is possible, being exacted as a test of "necessity; but it must at the same time be remembered that there are classes of men, "women, and children who cannot work on the roads; many of them too are in remote "villages and out-of-the-way places; they will sometimes die without complaint rather "than come to relief-houses and make their wants known." The members of Committees must be trusted to find out these people, "to judge of their real wants and "reasonable prejudices, and to do what is possible to combine economy of means with "efficient relief."

78. *Duties of the Relief Committee.*—On the 13th February, the Government of India declared its views[4] as to the field which the Central Relief Committee ought to occupy, and the manner in which gratuitous relief should be administered. "The whole force "of the administrative machinery of Government must be directed to the transport and "distribution of food. The responsibility of ensuring a supply of food to those who "cannot obtain it by other means must rest with the Commissioner of the division and "the local officers." The functions of the Central Committee, as far as regarded such tracts as North Behar, should be "confined therefore to collecting subscriptions, and "arranging for the supply of money or food to the District committees," to which the management of all details should be left, the Central Committee interfering as little as possible; they would of course not purchase grain except from the Government stores.

79. *Abolition of tests.*—The Viceroy then went on, in a most important passage, to declare the views of the Supreme Government as to the distribution of gratuitous relief, the abolition of any system of tests, and the preferability of placing reliance on the personal local knowledge of the distributor.

Para. 7.—"Where distress arises from a general deficiency of the food-supply of a large area of country, which deficiency cannot be met by private traders, stringent labour tests are not applicable. The labour test was tried during the earlier portion of the Irish famine; it failed, and ultimately gratuitous distribution of cooked food was substituted. It was under the latter system, coupled with the sale of grain at market rates by Government where private traders could not supply it, that the Irish famine was at last successfully dealt with. The circumstances in India are not entirely similar, but it appears to His Excellency that where they differ, the difference would point to an extension of the system of gratuitous distribution of food, and especially to the establishment of a system of advancing

[1] B. B. II, 84. (T.) [2] *Ib.* II, 105. (T). [3] *Ib.* I, 171. [4] *Ib.* I, 239.

supplies of food to cultivators. When distress extends to whole classes of the population, His Excellency relies upon the local knowledge of the persons entrusted with the distribution of relief to prevent abuses.

PARA. 8.—"This subject is one of great importance. The provision of employment for the labouring population upon public works was directed, and in His Excellency's opinion properly directed, at the outset of the period of scarcity as a preliminary and precautionary measure, so that the means of providing themselves with subsistence might be afforded to the labouring population, and to the smaller cultivators who were not altogether unaccustomed to labour for hire. This application of public works has been proved to be sound by the experience of former periods of scarcity in India, but any system of relief by public works becomes impracticable when applied to a very large proportion of the population of a country. In order to apply it under those circumstances, unprofitable work must be found simply as a test by which to prove that the persons applying for relief are proper objects upon which to bestow it. Any application of such a test upon the scale that would be necessary in dealing with North Tirhoot would in His Excellency's opinion inevitably break down, and, moreover, by congregating cultivators at centres for the purpose of giving them employment entail not only considerable hardships upon the people, but, as was found to be the case in Orissa, more serious evils.

PARA. 9.—"These observations are by no means intended to imply that wherever useful work can be found, whether of a public or of a private character, advantage should not be taken of it as affording a most valuable aid to the general system of relief, but they have been made for the purpose of preventing the relief committees from considering the universal application of a rigid labour test to be recommended by Government."

80. *Rules for Relief Committees.*—The rules for the guidance of the sub-divisional and sub-committees were originally issued on the 26th January, but were afterwards slightly amended, and stand thus[1] in their final form:—

Their principal functions were to be:—

(*a*) To collect subscriptions, and to distribute the resources which will be at their disposal from local subscriptions, from the contributions of Government, and from the grant received from district committees.

(*b*) To distribute for relief purposes grain received from local sources or Government depôts.

(*c*) To transport grain to convenient places, and to provide for its proper storage.

(*d*) To distribute gratuitous relief to persons in need of it and unable to work.

(*e*) To provide useful employment for those people who are in need, and are able to work, by instituting minor relief-works, and providing other employment, such as spinning, weaving, husking rice, &c. Sub-divisional committees will have information of the Government public works in their neighbourhood in order that labourers may be despatched to those works, together with their families if desirable.

(*f*) To provide in such manner as may be considered the best, in each particular locality, for the relief of persons whose caste, usages, and feelings preclude the application of a labour test—women of good family and others who may be in great distress. Relief for this class of persons may be afforded either wholly gratuitously or partly gratuitously, by the sale of grain under the market rates, or, with due precautions, by the advance of money or grain to be subsequently repaid.

(*g*) If a serious deficiency of grain in any part of their district is apprehended, which the trade is unable to supply, the sub-divisional committee may, under instructions from the collector of the district, make arrangements for the sale of grain from Government stores. The arrangement should, as a rule, be made through the agency of the traders, which will probably be available everywhere. The selling price should be fixed at that of the nearest large mart. where supplies are readily brought in by railroad or river, together with such addition representing the cost of transport as may be considered proper. Sales should be stopped as soon as the trade receives sufficient supplies, and any competition with the local trade should be carefully avoided. This rule will not interfere with the sale of rice under the market rate as a means of relief under clause (*f*) to persons whose cases have been inquired into by the committees or their officers.

(*h*) The congregation of large masses of people away from their homes for the purpose of relief should be avoided. Every village in which general distress exists should, so far as practicable, be dealt with separately as regards relief-works and the distribution of gratuitous relief. The acceptance of cooked food should not be insisted upon as an invariable test to be applied to all who require relief. In the very distressed districts such a test would generally be inapplicable. It may be necessary to establish poor-houses in some places, such as considerable towns. In those houses food might be distributed, cooked or uncooked, as may be most convenient. Generally speaking, those who are unable from illness to cook their own food should be provided for in hospitals.

81. *Sir G. Campbell advocates the test of cooked food.*—On the 16th February[2] Sir G. Campbell wrote the following passage in reference to paragraph 7 of the Viceroy's minute quoted above, to explain what in his view was the province within which tests were useful and applicable. He considered that a note he had written had been misunderstood by the Viceroy:—

"He there intentionally used the expression 'test' and not 'labour test,' for he has never overestimated labour tests alone. As a member of the Orissa Famine Commission, and elsewhere, he has, on previous occasions, pointed out how ineffective such tests become when famine has gone beyond a certain point and labour becomes nominal; and while seeking to utilise labour to the utmost, he has never insisted on its usefulness beyond a certain point."

[1] B. B. I, 289, 290. [2] *Ib.* I, 274.

PARA. 3. —"At the last conference at Government House, the Lieutenant-Governor submitted to His Excellency the Viceroy, as a question for discussion and instruction, the question now under consideration, as follows:—

"'V.—When the numbers to be relieved get beyond ordinary poor-houses and careful individual village relief, is it desirable to insist on labour on Government works in return for full rations or strict poor-house test? or is it better to give up the attempt to exact labour, and simply to give to all who seem to be poor a minimum of the poorest sustenance—gruel cooked by the Brahman according to Sir George Balfour's recipé?"

On the same day he issued a circular forwarding the Government of India's letter of February 13th quoted above, and saying[1]—

"As regards paragraphs 7, 8, and 9, it will be understood that it is by no means intended to discourage the system of relief-works which has been hitherto enjoined, or the employment of both the inmates of poor-houses and those receiving outdoor relief in various ways, as contemplated by the instructions. So long as famine does not reach an extreme point the relief-works and other employments will both utilise the available labour, act as a test of real need, and keep the people receiving relief engaged in manner conducive to their well-being. Is is only when want becomes so general that it is impossible to employ a whole population, or to obtain any real or adequate work from great numbers employed on nominal work which they do not do, that the instructions of the Government of India become applicable. If such a state of things should unhappily come about the Committee's instruction that gratuitous relief must be given to those for whom work cannot be found will come into play. In that case it may be necessary to give food to all the needy, and the test on which we must chiefly rely must be that on which the Committee has insisted, *viz.*, that, as a rule, the gratuitous relief so given must be in the shape of cooked food. In this country the great mass of the people are little inclined to accept charity in this form, and this alone will be in their case a sufficient test of their needs. It would be impossible to dispense with this test, because if uncooked grain were distributed gratuitously to all we should certainly be called on to support the whole population—a task beyond the means of Government—unless it be under extremely exceptional circumstances in limited tracts. The Committee's rules amply provide for searching out and relieving those who have good social or other grounds for objecting to the form of relief by cooked food, and are yet so poor and helpless as to require gratuitous relief, which in such cases is to be given by assignments of uncooked food."

PARA. 4.—"Again, if famine does not reach the extremest degree of severity, or as soon as it begins in some degree to abate, it is of very great importance that no portion of the population hitherto self-reliant should be allowed to sink into confirmed paupers, and the utmost vigilance must be used to wean such people from dependence on charity, and restore them to self-support. For this purpose, both as a test and as a step towards return to habits of self-reliance, the exaction of labour will be most beneficial, and should in no degree be neglected."

82. *Duties left to Central Relief Committee.*—On the 21st February some instructions were examined which the Central Committee proposed to issue to the Subordinate Relief Committees, and which it was thought might conflict with the orders issued by Government, and place the local officers in a difficult position under two masters. It was decided by Lord Northbrook[2] that in the very distressed districts (these were declared to be seven in number—Tirhut, Champáran, Saran, Bhagalpur, Purneah, Dinajpur, and Maldah) it was better that Government should take the whole cost of ordinary relief, including the gratuitous distribution of food, into its hands, making no charge against the charitable funds, and in those districts the functions left to the Central Committee were only two—to provide useful employments, such as spinning, weaving, &c., or allowances of money and clothes, for those who neither went to the Government relief-works nor received the Government grain. In other parts they were to carry out the functions entrusted to them by the rules, to pay for the Government grain they distributed at a rate less by 10 per cent. than the wholesale rate ruling in the nearest large mart where there were ample supplies (*e.g.*, for the Patna Division the Patna rates were to rule the price to be paid[3]), and to employ, appoint, and pay for the relief agency. But on further consideration, even this position was seen to have its inconveniences: the distinction between very distressed and distressed districts was withdrawn,[4] and it was decided that the Local Relief Committees should be entirely under the orders of the district and sub-divisional officers, and should receive no instructions at all from the Central Committee, whose functions were restricted to the collection and distribution of funds and the receipt of reports.

83. *The test of cooked food repudiated.*—Sir G. Campbell's views about tests, and especially about cooked food, were however too stringent, in the Viceroy's opinion: and on the 6th March, while republishing the amended rules for Relief Committees, he wrote as follows:—[5]

"The Government has not prescribed the invariable use of any test either by labour or by the distribution of cooked food, for the purpose of determining who are fit objects for relief. Such tests are desirable and necessary under certain circumstances. It is right that able-bodied men, accustomed to labour, should, as a general rule, be required to work in return for the food and money supplied to them. It is desirable that light work should be found for others where this can be arranged profitably, and without obliging large numbers of people to leave their homes. In dealing with certain classes of

[1] B. B. I, 275. [2] *Ib.* I, 286–7. [3] *Ib.* I, 281. [4] *Ib.* I, 290. [5] *Ib.* I, 292–3.

distress, especially in towns, the issue of relief cooked food may be useful as a test. But stringent tests are inapplicable to those limited tracts of country where, owing to the great failure of the crops and the absence of private trade, the Government have, in accordance with their Resolution of the 7th November last, assumed the task of importing grain for sale and distribution to the people.

"In such tracts the difficulty will be not to prevent undeserving applicants from being relieved, but to ensure that sufficient supplies reach those who require them; and, in addition to the modes of relief and the provision for the sale of grain specified in the instructions to Relief Committees, grain should be freely advanced to zemindars and mahajuns under the instructions already issued by the Government of Bengal, as well as to the cultivating ryot, where there is a reasonable probability of repayment, at the discretion of the local officers, and with due regard to the maintenance of a sufficient reserve."

On receipt of this,[1] Sir G. Campbell cancelled so much of his circular of February 16th as referred to the application of the test of cooked food.

84. *Objections to cooked food.*—After his visit to North Behar, Sir G. Campbell wrote as follows,[2] regarding the administration of relief, when the test of cooked food was not applied:—

"The only form of gratuitous relief which can be given somewhat indiscriminately, without leading to great abuse and future difficulty, is cooked food. It is clear that the people of Behar will not accept this form of relief in any numbers till they are very much straitened. It is not that the lower orders have much caste—many of them will eat almost anything; but they are curiously timid, afraid that we may ship them off beyond seas and what not, and very averse to altering their habits."

85. *Gratuitous relief given in raw grain.*—In the middle of April[3] it was decided that gratuitous relief should be, for the most part, given in grain.

"The issue of rations in grain to the recipient of charitable relief was arranged without difficulty. The grain consisted generally of rice. It was necessary that, together with the rice, some other kind of grain, or some vegetable and condiment, should be taken. To enable these people to purchase the accessories, a small portion, one-sixth, of the ration was given in money. It was not found expedient as a rule to issue cooked food or prepared food, save in a few places. * * * Registers had been prepared of all fit recipients of this relief. The tickets entitling the people named to gratuitous relief had been issued to each person or to each family. Those who were able to do any, even the lightest kind of work—weaving, spinning, or the like—had their tasks allotted. Those who were unable to take any care of themselves were lodged in poor-houses, or placed under medical supervision. There was still, however, some difficulty in searching out all the fit objects of this relief. The superior officers of the circles, on going their rounds in the villages to see whether the registration had been completely done, would find here and there some feeble person not included in the registers. And at each weekly or bi-weekly inspection by the group or sub-circle officials the nominal roll was swelling. In justice to the people it must be said that but little imposture came to light; we had to guard rather against their holding back unduly than against their coming forward improperly. Whether from shyness, or ignorance, resignation, or despair, they often faced mortal danger in a manner which inspired both pity and esteem.

"By degrees those persons who, from caste, delicate nurture, social seclusion, or such like reasons, could neither work nor beg, were added more and more to these lists. In North Behar, the Tirhootea Brahmins form a very numerous class. Some few of them were induced to work for Government wages, by the persuasion of a relief officer who was himself a Brahmin. It is probable that the majority of them would, sooner than work, have drifted into a condition near to starvation. The local authorities deferred relieving these cases as long as possible, but gradually admitted them according as the imperative demands of safety might dictate. The people of this class, however, were, from a natural pride, often unwilling to be regarded as recipients of altogether gratuitous relief, and would endeavour to pay something, however small.

"In the Burdwan Division only was there any reason to take precautions against imposture. There the endemic fever had necessitated the administration of relief, medical or other, during several years past, and some classes had gradually fallen into habits of undue dependence on public charity. Here the issue of cooked food served as an effective check in this division."

86. *Statistics of gratuitous relief.*—The total quantity of grain distributed gratuitously is nowhere stated in Sir R. Temple's closing minute: it can, however, be arrived at in the following manner:—

| | Tons. | Tons. |
|---|---|---|
| Total quantity of grain disposed of | | 343,000 |
| *Deduct*— | | |
| Sold to public | 118,107 | |
| Advanced in loans | 107,877 | |
| Given as wages to labourers | 60,401 | |
| Total | | 286,385 |
| Balance available for gratuitous distribution | | 56,615 |

[1] B. B. I, 291. [2] *Ib.* I, 330. [3] *Ib.* II, 93. (T.)

This agrees fairly well with Mr. MacDonnell's figures, according to which the quantity distributed was 50,058 tons. The cash distributed[1] was Rs. 25,54,000; so that the total cost of gratuitous relief (taking the grain at Rs. 135 per ton) was Rs. 93,12,000. The average number daily relieved during each month in each famine district is shown in the detailed statement which follows (compiled from Mr. MacDonnell's report) of which this is an abstract:—

| | No. |
|---|---|
| January | 378 |
| February | 3,708 |
| March | 24,003 |
| April | 168,245 |
| May | 305,052 |
| June | 508,770 |
| July | 685,595 |
| August | 582,361 |
| September | 318,161 |
| October | 23,272 |
| November | 4,118 |
| Total | 2,623,663 |

[1] The total cost of charitable relief, according to Sir R. Temple's final Minute, was Rs. 28,00,000. The difference may be due to the cost of establishments and miscellaneous charges.

STATEMENT showing the number of People relieved in BENGAL gratuitously during the FAMINE of 1873-74.

| Districts. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | Total Number Relieved. | Average Monthly Number. | Average cost per head per mensem. | Grain distributed in Charitable Relief. | Cash distributed in Charitable Relief. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Rs. A. P. | Tons. | Rs. |
| Shahabad, p. 23 - - | — | — | 187 | 1,387 | 2,996 | 935 | 2,762 | 2,747 | 1,501 | — | — | 12,515 | 1,788 | 5 12 5 | 287 | 33,566 |
| Saran (45) - - | — | — | 824 | 3,590 | 5,801 | 4,842 | 7,450 | 9,404 | 3,603 | — | — | 35,514 | 5,073 | 10 8 11 | 610 | 2,92,663 |
| Darbhanga - - | — | — | — | 82,642 | 130,178 | 169,250 | 187,129 | 173,518 | 72,654 | — | — | 815,371 | 135,895 | 2 9 5 | 14,351 | 1,73,250 |
| Muzaffarpur - - | — | — | 5,550 | 9,921 | 16,818 | 60,655 | 43,774 | 39,404 | 13,407 | — | — | 189,529 | 27,075 | 3 3 3 | 3,448 | 1,41,711 |
| Champáran - - - | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 1,190 | 36,950 |
| Gya - - - | — | 162 | 238 | 407 | 533 | 1,397 | 1,813 | 1,920 | 1,158 | — | — | 7,628 | 953 | 5 6 6 | 220 | 11,522 |
| Bhagalpur - - - | — | — | 1,486 | 1,354 | 12,522 | 47,580 | 37,217 | 37,730 | 49,382 | — | — | 187,271 | 26,753 | 3 11 9 | 4,232 | 1,28,064 |
| Monghyr - - - | 70 | 960 | 2,630 | 4,125 | 3,300 | 4,284 | 4,212 | 3,637 | 1,902 | — | — | 24,310 | 2,701 | 5 7 2 | 360 | 83,865 |
| Santhal Parganas - - | — | — | — | — | 58 | 1,007 | 2,072 | 3,438 | 2,395 | — | — | 8,970 | 1,794 | 1 13 6 | 121 | 224 |
| Purneah - - - | — | — | 797 | 3,844 | 8,233 | 16,538 | 36,180 | 33,331 | 3,572 | — | — | 102,495 | 14,642 | 4 5 11 | 1,897 | 1,92,000 |
| Dinajpur - - - | — | — | — | 9,926 | 19,500 | 40,921 | 83,410 | 44,363 | 21,668 | — | — | 219,788 | 36,631 | 2 1 0 | 2,732 | 87,633 |
| Rangpur - - - | 308 | 2,303 | 6,796 | 16,805 | 23,600 | 34,457 | 24,093 | 8,150 | — | — | — | 116,512 | 14,564 | 3 1 4 | 1,517 | 1,54,975 |
| Maldah - - - - | — | 283 | 482 | 2,209 | 8,142 | 11,107 | 11,853 | 8,102 | 3,905 | — | — | 46,083 | 5,760 | 4 6 11 | 1,315 | 26,951 |
| Murshidabad - - | — | — | 373 | 1,700 | 2,695 | 7,860 | 16,159 | 21,592 | 11,962 | — | — | 62,341 | 8,906 | 9 8 7 | 2,642 | 2,38,000 |
| Rajshahai - - - | — | — | 141 | 2,880 | 9,050 | 18,224 | 46,564 | 45,283 | 10,896 | — | — | 133,038 | 19,005 | 2 7 5 | 2,080 | 46,998 |
| Bogra - - - | — | — | 621 | 4,100 | 25,775 | 19,534 | 36,250 | — | — | — | — | 86,280 | 17,256 | 4 10 3 | 2,549 | 56,440 |
| Pabna - - - - | — | — | — | 290 | 276 | 6,225 | 8,945 | 6,526 | 5,284 | — | — | 27,546 | 4,591 | 0 12 6 | 70 | 12,211 |
| Birbhum - - - | — | — | 504 | 2,698 | 7,638 | 14,463 | 22,435 | 34,858 | 30,213 | — | — | 112,809 | 16,116 | 2 8 0 | 1,725 | 49,456 |
| Bankura - - - - | — | — | 960 | 5,182 | 9,520 | 19,540 | 38,148 | 25,223 | 11,306 | — | — | 109,879 | 15,697 | 2 1 2 | 930 | 1,02,659 |
| Bardwan - - - | — | — | 2,414 | 11,997 | 11,145 | 19,090 | 56,989 | 65,373 | 64,098 | 23,272 | 4,118 | 258,496 | 28,722 | 5 10 9 | 6,812 | 5,46,723 |
| Nadiya - - - - | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 264 | 54,000 |
| Manbhum - - | — | — | — | 3,188 | 7,272 | 10,861 | 18,140 | 17,762 | 10,065 | — | — | 67,288 | 11,215 | 2 10 10 | 706 | 84,857 |
| Total - - | 378 | 3,708 | 24,003 | 168,245 | 305,052 | 508,770 | 685,595 | 582,361 | 318,151 | 23,272 | 4,118 | 2,623,663 | 395,137 | 3 6 11 | 50,058 | 25,54,718 |

The numbers relieved, however, in Champáran and Nadiya are not known, though the amount spent on them is: assuming that the sum expended fed as many people here as in the average of all other districts, 90,000 people must be added to the total number, raising the figure to 2,713,663.

Looking only at the six months, April to September, during which this relief was mainly given, the average number relieved daily was 452,277, and the average cost per head per mensem was Rs. 3-6-11.

87. *Operations of the Central Relief Committee.*—Of the operations of the Central Relief Committee very little is on record. They received altogether[1] from the public Rs. 28,26,690 (of which Rs. 14,65,000 were contributed in Great Britain), and an equal sum from Goverement: and they expended altogether Rs. 42,90,000, of which Rs. 27,00,000 was paid on account of grain received from the Government stores. Details of the rest of the expenditure are not given.

## Advances to Ryots for Subsistence.

88. *Early views on the subject.*—The first form which this mode of relief took was the suggestion by Lord Northbrook,[2] December 16th, that zemindars would no doubt be glad to support their ryots, and to receive advances from Government for this purpose; but that if they did not show alacrity in doing this, and if it was difficult for cultivators to give security, some legislative enactment might be passed to the effect that their landlord shall stand security for the repayment. On the 3rd February[3] the Lieutenant-Governor ruled that it was impossible to wait for legislation at such a time: advances might be given, not to zemindars only, but to inferior and intermediate holders, for the use of their ryots, and that when they would not take them, money might be advanced direct to the cultivators as a loan by the Relief Committees under their rules.

89. *Enlarged application of those views.*—A few days later (February 16th), Sir George Campbell wrote again[4] that the reports he had received convinced him that in many "Districts, perhaps the most pressing want, and even in the most distressed Districts "one of the greatest wants, is for advances to tolerably reliable ryots who only want a "little help to tide them over the worst time." Every effort was to be made to urge and encourage the zemindars and holders of landed interests to "sustain their ryots" by advances of grain or money; and special report should be made of those estates in which the zemindars could not or would not do this, and Government would be forced to intervene. The effect of this liberality was what might have been expected. Mr. Hudson reported:—[5]

"It is evident that a rumour has spread abroad that there is a distribution of money on the part of Government; and there is a rush from all quarters to get a share of it without any general understanding on the part of the applicants of the objects of the distribution, and without (in many cases) any necessity for it, or any clearly defined object of their own in seeking it."

District officers were besieged by petitions for loans from small cultivators who each offered to pledge his fields or trees or some such property he claimed a right in: but the zemindars invariably denied the existence of any such right, enquiry at such a time into such a number of cases was impossible, and when it was made it often turned out that the rights claimed were imaginary, or that the applicant was not at all in distressed circumstances. Petty traders also applied largely for advances to enable them to import grain.[5]

"These applicants, before they had learnt the catch-word (so to speak), frequently admitted that their object was to buy up grain in their own immediate neighbourhood, and to sell it again; but when my questions had instructed them a little, they of course professed an intention of importing grain from the great Government depôts—Revelgunge, &c. It is clear that, while this endeavour on the part of decayed tradesmen to obtain a fresh capital was a gross attempt to pervert the benevolence of Government into a means of private gain, to scatter abroad small sums to be employed in the manner first disclosed would only be to raise the price of grain by creating a competition amongst petty dealers to obtain possession of it."

Other ryots again applied for grain advances on the plea that their money-lender had refused to grant them any further supplies, and on enquiry it was found that he had done this for the excellent reason that they had owed him money for long and had paid him nothing during the two preceding good years. Sir George Campbell recognised[6]

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[1] B. B. II, 80, 81.(T.) [2] *Ib.* I, 98. [3] *Ib.* I, 221. [4] *Ib.* I, 276.
[5] *Ib.* I, 298. [6] *Ib.* I, 302.

" the dilemma in which we are placed, namely, on the one hand, the difficulty of " affording any really wide and adequate relief, if we insist on sufficient security; and " on the other, the way in which the liberality of Government may be and will be abused " if we adopt a lax and easy procedure," He could only say that " when it is neces- " sary to save life or to keep the people from sinking into pauperism, the Collector " must obtain the best security he can, and advance money to ryots if he considers " there is a reasonable certainty of repayment."

90. *Advances given still more liberally.*—After his visit to Darbhanga, Sir G. Campbell was inclined[1] to accept a suggestion that when a ryot by labouring on the relief-works has shown his necessity, wages should be advanced to him for the time he must be absent carrying on his cultivation.

PARA. 42. * * * "If the individualising system is carried out fully, and if we know who our labourers are, where they reside, and where they work, we may be able to say to a poor man when the rains commence—we now know that you are no impostor, but a person willing to work for your bread; we cannot employ you longer; it would ruin the country if we could; here is a couple of months' supply of food; we give you that, take it home, but now you must support yourself; we have done with you. Seeing the amount of grain we are storing, and the scale on which our establishments are now being formed, I think this might be done in some parts of the country." * * *

But in North Behar there was a large class of high caste ryots too proud to work and too poor to carry on efficiently the work of another season without assistance. To give money, nominally as a loan, but really with no hope of ever recovering it, would be demoralizing in the extreme; and the business of opening a great system of direct advances to a vast number of ryots would overwhelm the officers. He therefore strongly urged that advances should be given through zemindars and money-lenders; the main security offered by most borrowers was their silver ornaments; but Government could not open a pawnbroker's shop, while the money-lenders could. Villages should be divided into three classes; those in which the zemindar can assist his ryots, and should by every means be induced to do so; those in which he has not the means but has the will, if he gets advances, to the proper use of which our officers must see; and, thirdly, those in which it is found impossible to work through the zemindars, and Government must undertake the task of saving the people alive. But even here it would be better to make use of the money-lenders to whom the villagers are accustomed to look, and to lend money through him rather than directly. The terms of these advances were that half was to be repaid in March 1875, and the rest in March 1876, the price being fixed at 15 seers per rupee at first, and afterwards lowered to 18 seers per rupee. At the prices of ordinary years[2] a ryot would have to sell two maunds of grain to repay the price of one maund advanced in 1874, thus the cost to him would be cent. per cent., and yet there would be no gain to Government but a loss equal in amount to his loss, as the grain cost Government 8½ seers per rupee.

91. *Results of the advances.*—On the 7th November 1874 the Government of Bengal reported[3] that—

"The advances of grain made to zemindars and ryots under the principle originated in the above-mentioned letter have now amounted to over 29,24,000 maunds (108,000 tons), valued at close upon £700,000. The Lieutenant-Governor believes that these advances have been of the greatest possible benefit to the afflicted districts, for by them nearly half a million families have been supported or helped over the rainy months, while small occupiers of land have been enabled to hire field labourers, and so to secure a crop this season on lands which would not otherwise have been cultivated for want of labour."

92. *Measures for their recovery.*—The question now was how to recover these advances. " The great majority of ryots who took them are ready and willing to repay them by the " instalments fixed by Government. But among so great a body of men, there must be " some individual recusants who will evade repayment if possible, and the advances were " in many districts made with a degree of expedition which may have precluded the " fulfilment of all the needful legal formalities." In fact, the bonds were in most cases neither stamped nor registered, and even if they were made legally valid, to sue a recusant ryot in the Civil Court would cause great delay and would ruin him with costs: the amount advanced to each ryot averaged from four to eight maunds of grain (worth from 10 to 20 rupees), and the costs would be out of proportion to the value in suits for instalments of petty sums like these. Accordingly, it was proposed that a law should be passed to make these advances recoverable as an "arrear of demand," a procedure which, though summary, was neither harsh nor expensive, and to this the Government of India agreed.

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[1] B. B. I, 336. [2] *Ib.* II, 96. (T.) [3] *Ib.* II, 56.

93. *Amount advanced.*—The quantities of grain advanced to cultivators were as follows:[1]—

| | Tons. |
|---|---|
| Up to the 10th June - - - | 14,412 |
| „ 10th July - - - - | 45,376 |
| „ 10th August - - - | 82,935 |
| „ 10th September - - - | 102,828 |
| „ 10th October - - - | 107,877 |

It is believed that the recipients of this grain were about 400,000 people.

94. *Value advanced and recovered.*—The value of 108,000 tons of grain at 18 seers per rupee amounts to Rs. 67,20,000. In Sir R. Temple's final minute[2] it is estimated that Rs. 62,50,000 are likely to be recovered; and from a subsequent passage it appears that this was based on an estimate that 85 per cent. of the value of the grain would be repaid: the value must therefore have been estimated at Rs. 73,50,000. Besides the grain, Rs. 46,00,000 in cash were advanced to planters, zemindars, traders, &c., and this, was expected, would be repaid in full, making a total recovery of Rs. 1,08,50,000. A return prepared by the Government of Bengal for the use of the Famine Commission in February 1879 shows somewhat different figures:—

| | Rs. |
|---|---|
| Advanced in cash - - - | 35,86,300 |
| „ grain (value) - - - | 69,68,440 |
| Total - - | 1,05,54,740 |

Of this up to July 1877—

| | | Rs. | Rs. |
|---|---|---|---|
| Recovered - | Cash - - - | 29,77,261 | |
| | Value of grain - - | 59,20,327 | |
| | Total - - - | | 88,97,588 |
| Written off as irrecoverable | Cash - - - | 1,43,175 | |
| | Value of grain - - | 4,892 | |
| | Total - - - | | 1,48,067 |
| Balance[3] - | Cash - - - | 5,54,828 | |
| | Value of grain - - | 9,54,258 | |
| | Total - - - | | 15,09,086 |

Out of which about three lakhs have been since collected, and twelve lakhs are still outstanding. If the whole of this sum is paid in, the amount recovered will fall very little below Sir R. Temple's estimate.

95. *General Considerations on the Subject.*—On the whole, considering the hurry and confusion of the time, the impossibility of investigating the security offered by the applicants and even the fact of their necessity, and the profuse way in which advances were given, or, according to some accounts, forced[4] on the people, it must be admitted that the extent to which they have been repaid is creditable to the honesty and self-respect of the ryots. But this should not blind us to the danger of the precedent, or to the cost at which this relief was given. The grain advanced cost the Government

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[1] B. B. II, 107. (T.).

[2] *Ib.* II, 110.

[3] The Districts where the heaviest balances remain are—

| | Rs. |
|---|---|
| Muzaffarpur - - - | 4,04,861 |
| Darbhanga - - - - | 1,76,905 |
| Saran - - - - | 1,34,758 |
| Monghyr - - - - - | 1,78,411 |
| Santhal Parganas - - - | 1,03,794 |
| Manbhum - - - - | 1,57,898 |

[4] See Reply to Famine Commission by Mr. Hodgkinson, Collector of Saran. "Not only was the power of "trade greatly neutralised, but the people became demoralized and reckless, seeing the extraordinary exertions "of Government to get rid apparently of as much grain as possible, by some means or other. Besides the "inducement to take advances held out by fixing low prices on the grain, the people were practically led to "believe it was almost their duty to take advances, and . . . . . that a paternal Government would "never demand repayment. The bitterness of feeling aroused by the realisation of these advances may be "inferred from my predecessor's remark in his annual report for 1876–77, *viz.*, that they would sooner die of "famine than be again induced to take advances from Government." Mr. Kirkwood, too, (Bhagalpur) thinks (though approving the system generally) that it was overdone, and "many persons thus supported themselves "in semi-idleness who should have been labouring on the roads."

Rs. 1,45,40,000, and out of this about Rs. 61,00,000 have been recovered, making a loss to Government of Rs. 84,00,000; it cost therefore Rs. 21 per head to relieve 400,000 cultivators. If they, including their families, were all in grievous want, or in danger of starvation, and if they received relief in no other form, this would be no excessive expenditure; but it is clear from the reports that many of them received relief in other forms also, and that the theory of personal knowledge taking the place of any test, to some extent broke down. The cultivators in their turn had to pay a severe penalty for their readiness to apply for advances; if they were forced to sell grain at thirty seers to repay what they had borrowed at eighteen seers, they have sold 165,000 tons in order to repay the loan of 95,000 tons. The danger of offering to an improvident people too tempting opportunities for getting advances which they will have to repay at a great sacrifice, is one that should be seriously thought of on any recurrence of similar circumstances.

### Miscellaneous.

96. *Emigration.*—In the Resolution of November 7th, 1873, the Viceroy expressed a hope that labourers might be induced to emigrate to such places as the tea districts of Assam and to British Burma. For the cost of the Burmese experiment 50,000*l.* was set aside, and a special officer, acquainted with emigration affairs, appointed to superintend the arrangements; but the outcome of all the efforts made in this direction was lamentably small. Up to the end of December 1874, 5,526 emigrants were sent off at a cost of about Rs. 19[1] a head, "and the class of people who actually consented to "go was not of much value to employers of labour. The emigrants gave a great deal "of trouble; and the experiment was most unsatisfactory as far as Burma was "concerned."[2] It was even more unsatisfactory as regarded Assam. The tea planters were unwilling to enter into contracts with emigrant-coolies, especially during a year of scarcity; it was evident that unless liberal bounties were allowed and a large recruiting staff entertained, no success would be obtained; and the scheme was abandoned in January 1874.

97. *Prices.*—With regard to prices, there is very little to be said, seeing that they were artificially kept down by the presence of the Government granaries and the resolution to open these for the use of the labourers, and ultimately for sale to the general public, whenever the market rates rose to 10 seers per rupee. But in the earlier months, before these preparations were complete, indications existed which led observers to the belief that prices would have risen very high had it not been for the import of the Government grain. Sir R. Temple says[3]—

"In some places" (of North Behar) "the price of rice was a rupee for 9, 8, or 7 seers; in other places, it was even 1 rupee for 6 and 5 seers, which rates indicated famine. In other places, there was no price quoted, as the article was not procurable at all."

And throughout the period of famine the prices at Patna and its neighbourhood were sufficient to make it worth while for private trade to pour in by railway from the Punjab, the North-Western Provinces, from Oudh and Central India, and from Lower Bengal, nearly 400,000 tons of grain.

98. *Effects of lowering the Railway Freight.*—The order reducing the freight of food grain on the railways by one half, or to $\frac{1}{8}$ of a pie per maund per mile, or one anna per 100 miles, was in force from the 1st November 1873 to the 1st August 1874; Government paying to the railway companies as compensation the amount foregone by them, or one anna per maund, or Rs. 1–12 per ton for 100 miles. The total sum paid as compensation was stated[4] to be Rs. 45,30,000. It is not said how this calculation was made: but in March Mr. Bernard had estimated[5] that every ton travelled 400 miles on an average. If this estimate hold good, the amount paid represents 647,000 tons brought in by private trade. If the compensation was paid (as estimated above, paragraph 60) on 383,000 tons, then each ton of grain travelled on an average nearly 700 miles. Against this expenditure may be set the profit brought to the Government by the increased railway traffic which the famine created, and which Sir R. Temple calculated at Rs. 63,23,150.[6]

[1] B. B. II, 125. (T.) Only 1,199 of these were from Behar. See Mr. Toynbee's reply to Famine Commission.

[2] Government of Bengal, to Famine Commission, dated 8th February 1879.

[3] B. B. II, 82. (T.)

[4] *Ib.* II, 110. (T.) But in Colonel Dicken's note of 29th November 1875, it is stated as Rs. 45,60,000.

[5] *Ib.* I, 234.

[6] Of this, Government paid Rs. 33,30,000 for the transport of its own grain. The net increase on all railways in India, excluding the above sum, was Rs. 6,70,000 for 1874–75 (*vide* Colonel Dickens' note, *ut supra*).

The Government of India recorded,[1] in the Resolution of 18th February 1875, that the effect of the measure had been "to stimulate the importation of grain by railway "into the distressed tracts;" but there is nothing to show in what way it was believed to have acted, whether by making it profitable to despatch grain from great distances which under the higher rate of freight would have baen prohibitory, or by putting additional profit into the pockets of the despatchers who would have found the trade sufficiently advantageous even at the ordinary rates of freight.

99. *Treatment of Subjects of Native States.*—It was at one time feared that Nepal would have to be added to the famine-stricken area;[2] and the question arose how far the people of that country were entitled to share in the measures of relief designed for Bengal. Sir R. Temple decided that if Nepalese subjects applied for work on relief, they should be treated in the same manner as British subjects, even though their number were thought likely to be as large as half a million (see paragraph 47), and that grain should be supplied to the Nepalese Government at cost price. But in the end it was found that only 1,000 tons of grain were applied for on these terms, and the Nepalese got through their difficulties without any further assistance.

100. *Lesson for future Guidance drawn by the Supreme Government.*—The Government of India reviewed Sir Richard Temple's final Minute in a Resolution[3] dated 18th February 1875, and drew the following conclusions for the guidance of future administrators from the experience gained in 1874. The first point dwelt on was the necessity of obtaining early and complete reports of the extent of any failure of the crops, and of the probable consequences on the food-supply of the people. The next was the importance of strengthening the district staff, so as to set the officers free to learn the actual condition of the people. With regard to relief-works it was laid down that "large works should be opened at once, smaller local works subsequently, as the "necessity for them arises. When the distress becomes extensive, it is essential that "employment should be available near the usual homes of the people." When the numbers are very large, "piece-work is preferable to other methods for their payment." In the most distressed districts "the tests of cooked food and of poor-houses are inapplicable." The giving advances to cultivators was found very useful. The food-supply should be looked to, and "where there is a great deficiency, and good reason to believe that the traders will be unable to meet that deficiency, it may be right for the State to intervene for the purpose of supplementing the general food supply. In doing this, it was better to draw supplies from a distance, and to try by private arrangement with merchants rather than for Government to appear openly in the market. Great advantage has resulted from reducing the railway rates for the carriage of grain.

No doubt the quantity of grain imported had been excessive; but for that the Government of India was solely responsible.

"Having to deal with so vast a population, whose support depended upon many uncertain contingencies, it would have been imprudent not to have been prepared to meet larger demands than those which were actually made upon the Government. If a substantial reserve had not been provided, the success of the relief operations would probably have been attributed rather to good fortune than to foresight. The experience of last year shows the necessity of such a reserve. In the beginning of September 1874 very great apprehensions were felt that the scarcity would be prolonged. This was only averted by a fall of rain at the very last moment when it could have been of use to allow the winter crops to be sown; and if the rain had not then fallen, the rice in reserve would have been urgently required. It must not be forgotten that on previous occasions it has occurred that a second year of drought has followed the first."

## Discussion of the results of the Famine Administration.

101. *Statistical summary of expenditure and relief.*—The following statement shows the cost of the famine according to the figures drawn up by Sir R. Temple on the 31st October 1874, and two columns have been added to compare therewith the estimates which were made at two intermediate periods. It is instructive to observe how the expenditure increased as the principles of relief relaxed and the measures adopted grew in liberality and breadth. The figures in the column for actuals are taken from the Budget statement of 1875–76,[4] except those for advances recovered, which are from paragraph 94. The Budget Statement takes no notice of advances on either side of the

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[1] B. B. II, 64. [2] *Ib.* I, 223. [3] *Ib.* II, 61.

[4] See page 58, the Budget Statement of 1876–77, p. 84, however without giving details, states the net expenditure at Rs. 6,75,85,330 including Rs. 65,60,000 brought to account in the preceding year omitted till then. Against this set-off is allowed of Rs. 17,00,000 from increased Railway Traffic, leaving a total charge of Rs. 6,58,85,330, or six and a half million sterling.

account, but notes that about half a million further was expended out of Provincial or Local Funds.

EXPENDITURE.

| Items. | Estimate of 4th March. | Estimate of 13th April. | Sir R. Temple's figures. | Actuals (as far as known). |
|---|---|---|---|---|
| | Rs. | Rs. | Rs. | Rs. |
| Special Establishments | 5,00,000 | 13,50,000 | 12,00,000 | 25,00,000 |
| Promotion of private grain trade | 15,00,000 | 34,00,000 | 45,30,000 | 45,60,000 |
| Relief-works | 1,00,00,000 | 2,53,00,000 | 1,28,00,000 | 1,10,80,000 |
| „ excluded from local or private funds. | — | — | — | 65,60,000 |
| Grants in aid of private works | 5,00,000 | 5,00,000 | 1,00,000 | — |
| Darbhanga State Railway | — | 20,00,000 | 10,00,000 | 14,50,000 |
| Government grain purchase | 3,00,00,000 | 3,78,40,000 | 4,40,00,000 | 4,47,06,000 |
| „ „ transport | 1,44,50,000 | 1,75,00,000 | 1,76,00,000 | 1,76,28,000 |
| „ reserve transport train | — | 18,60,000 | 31,40,000 | 31,50,000 |
| Charitable relief | 10,00,000 | 20,00,000 | 28,00,000 | 31,71,000 |
| Advances to zemindars, traders, &c. | 50,00,000 | 50,00,000 | 46,00,000 | 46,00,000 |
| Unforeseen | 15,00,000 | — | — | — |
| Total expenditure | 6,44,50,000 | 9,67,50,000 | 9,17,70,000 | 9,94,05,000 |

RECEIPTS.

| Items. | Estimate of 4th March. | Estimate of 13th April. | Sir R. Temple's figures. | Actuals (as far as known). |
|---|---|---|---|---|
| | Rs. | Rs. | Rs. | Rs. |
| Sales of grain to labourers and the public | 1,50,00,000 | 1,83,30,000 | 95,00,000 | 2,62,40,000[1] |
| Sales of grain to Relief Committees | | 15,00,000 | 27,00,000 | |
| Sales of reserve grain in Calcutta | | 37,80,000 | 7,00,000 | |
| Sales of surplus grain in the interior | | | 30,00,000 | |
| Recoveries of cash advances to traders, zemindars, &c. | — | 45,00,000 | 46,00,000 | 31,00,000 |
| Recoveries of price of grain advanced to ryots | — | 71,40,000 | 62,50,000 | — |
| Miscellaneous | — | — | 5,00,000 | — |
| Increased Railway profits | — | — | 63,23,000 | 40,00,000 |
| Total receipts | 1,50,00,000 | 3,52,50,000 | 3,35,73,000 | 3,33,40,000 |
| Net expenditure | 5,00,00,000 | 6,15,00,000 | 5,82,00,000 | 6,61,00,000 |

[1] This includes sales of surplus stores, carriage, and steamers, and probably also the recoveries of price of grain advanced to ryots, as far as then known.

At this cost 735,000 labourers were employed for nine months; 452,000 were gratuitously fed for six months; 118,000 tons were sold during a period of seven months (April to October); and assuming that each person bought 1½ lbs. a day or 315 lbs. during the seven months, this quantity would supply 870,000 persons with food. If, again, a quarter of the labourers on relief-works were purchasers, there were about 700,000 of the public who benefited by the sale of Government grain at two-thirds of the cost price. The number who received advances of grain has been estimated at about 400,000 cultivators, or, including their families, 2,000,000 souls; and the number who benefited by the advances of cash to zemindars, traders, &c., was roughly estimated at 500,000. The following, therefore, is the number who in one form or another received relief:—

| | Number. | Period. |
|---|---|---|
| By relief-works | 735,000 | 9 months. |
| „ gratuitous relief | 452,000 | 6 „ |
| „ sales of grain | 700,000 | 7 „ |
| „ advances of grain | 2,000,000 | |
| „ „ cash | 500,000 | 7 „ |
| Total | 4,387,000 | |

or about 25 per cent.[2] of the population of the famine tract, as estimated in paragraph 19.

[2] Mr. Kirkwood states that at one time fully 80 per cent. of the population of some parts in the North of Bhagalpur were subsisting on Government relief in some form or other.

102. *District details of expenditure and relief.*—The relief administered may be shown in a different way, and the amount received in each District can be more easily compared, by assuming that the relief lasted for seven months, that each person who bought or received an advance of grain got 23 seers for a month's consumption, or 161 seers for seven months, at which rate every ton sold or advanced relieved almost seven persons: and similarly that every one who received an advance of cash received relief at the rate of 1 anna a day, or Re. 1–14 a month; so that every sum of Rs. 13–2 thus advanced relieved one person. This is the assumption made in Mr. MacDonnell's book, and it is subject only to one flaw. *viz.*, that the labourers who received wages in cash also bought grain and thus appear twice over in the number of relieved. By the system of calculation adopted in the table it appears that in the most distressed tracts 2,600,000, or 17 per cent. of the entire population, were relieved for seven months continuously, in the less distressed tracts 547,500, or 3 per cent., were so relieved. If it be assumed that half the labouring population bought Government grain and are shown twice over, these numbers will be reduced to 2,200,000 and 512,000 respectively, or 15 and 2·9 respectively :—

| Districts. | Population. | Grain imported. Tons. | Surplus unexpended. Tons. | Cash expended. Rs. | Number of Persons relieved Daily for Seven Months. | | | | Per cent. of number relieved to population. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Relief-works. | Gratuitous Relief. | Cash and Grain. | Total. | |
| Saran | 2,064,000 | 40,200 | 3,800 | 2,440,500 | 160,162 | 5,170 | 217,945 | 383,277 | 19 |
| Champáran | 1,441,000 | 29,180 | 1,600 | 981,200 | 71,720 | 11,031 | 155,710 | 238,461 | 17 |
| Darbhanga | 2,196,000 | 118,745 | 38,875 | 3,479,300 | 265,127 | 111,514 | 372,509 | 749,150 | 34 |
| Muzaffarpur | 2,188,000 | 60,352 | 13,283 | 1,463,600 | 160,662 | 24,913 | 254,221 | 437,796 | 20 |
| Bhagalpur (North half) | 957,000 | 26,318 | 6,218 | 460,600 | 25,407 | 27,726 | 111,621 | 164,754 | 17 |
| Purneah | 1,714,000 | 24,802 | 2,194 | 522,700 | 18,230 | 14,643 | 115,367 | 148,240 | 8 |
| Dinajpur | 1,501,000 | 39,674 | 7,961 | 1,272,400 | 56,780 | 32,227 | 210,151 | 299,158 | 26 |
| Rangpur | 2,149,000 | 12,955 | 2,925 | 781,800 | 17,880 | 16,687 | 74,133 | 108,700 | 5 |
| Bogra | 689,000 | 9,844 | 2,262 | 368,500 | 15,787 | 17,212 | 37,874 | 70,873 | 10 |
| Total most distressed tract. | 14,899,000 | 362,070 | 79,118 | 11,770,600 | 791,734 | 261,123 | 1,549,531 | 2,600,409 | 17·4 |
| Shahabad | 1,734,000 | 4,781 | 638 | 240,376 | 6,541 | 1,788 | 24,362 | 32,691 | 1·9 |
| Gya | 1,950,000 | 3,073 | 218 | 92,673 | 1,117 | 1,412 | 20,602 | 23,131 | 1·2 |
| Monghyr | 1,812,000 | 8,158 | 403 | 403,300 | 7,250 | 3,655 | 62,269 | 73,174 | 4· |
| Santhalia | 1,259,000 | 7,420 | 1,350 | 188,000 | 14,799 | 1,345 | 28,260 | 44,404 | 3·5 |
| Maldah | 676,000 | 3,946 | 228 | 182,200 | 4,384 | 6,623 | 20,920 | 31,977 | 4·7 |
| Murshidabad | 1,353,000 | 4,270 | 182 | 334,800 | 4,041 | 9,285 | 7,951 | 21,277 | 1·6 |
| Rajshahai | 1,311,000 | 4,685 | 1,860 | 233,700 | 2,136 | 19,784 | 14,488 | 36,408 | 3·5 |
| Pabna | 1,212,000 | 584 | 2 | 101,200 | 1,383 | 4,063 | 8,364 | 13,810 | 1·1 |
| Birbhum | 696,000 | 3,719 | 190 | 175,900 | 6,412 | 17,165 | 11,094 | 34,671 | 5· |
| Bankura | 527,000 | 3,180 | 76 | 255,500 | 3,053 | 15,404 | 15,283 | 33,740 | 6·4 |
| Bardwan | 2,034,000 | 13,380 | 2,067 | 679,600 | 7,241 | 35,855 | 29,424 | 72,520 | 3·5 |
| Nadiya | 1,813,000 | 883 | 20 | 315,400 | 3,473 | 17,149 | | 20,622 | 1·1 |
| Manbhum | 996,000 | 8,830 | 529 | 267,600 | 7,412 | 9,805 | 49,531 | 66,748 | 6·7 |
| Jalpaiguri | 418,000 | 3,321 | 179 | 94,408 | — | — | — | 32,330 | 7·9 |
| Total partly distressed tract. | 17,791,000 | 69,230 | 7,939 | 3,564,737 | 69,242 | 126,184 | 292,598 | 547,503 | 3 |

103. *The good side: no mortality.*—One result at least was attained by this lavish administration of relief that there was absolutely no mortality from starvation. As might have been expected in a matter to which public attention was so riveted, every death that could possibly be attributed to starvation was eagerly canvassed, and its causes closely investigated; but at the outside not more than 22 deaths could be said to have even been accelerated by hunger. Another point which may be noticed with satisfaction is that there seems to have been no permanent evil effect left on the minds and habits of the people: with one or two exceptions, such as have been noticed at Bardwan, they seem to have shown no willingness to continue to be treated as paupers, but to have gone back to their fields and ordinary occupations as soon as the first harvest was ripe.

104. *The other side: the means disproportioned to the end.*—But it is not sufficient for the advocates of a new policy, which deserts the old landmarks and cuts itself adrift from past experience, to prove that they effected their purpose: it is necessary also to show that the means employed were proportionate to the end aimed at, and that the resources of the State were not unduly wasted. In this respect the administration of the Bengal famine of 1874 can hardly be justified. A few paragraphs may well be devoted, at the conclusion of this section, to considering (1) what would be the effect on the finances of India if the principles of 1874 had been followed throughout the century; (2) how far those principles can be pronounced to have been correct in their application to the facts of 1873–74; (3) whether they were correct under any circumstances, or were altogether untenable.

105. *Cost of other famines, if treated on the Bengal system.*—It has been shown that on the relief of a population of 17 millions who were believed to be visited by severe famine, the sum of six million sterling was spent. Let it be assumed that this rate of expenditure was a proper one,[1] and that a similar rate would have been proper in all the greater famines with which India has been afflicted during the present century. Such a comparison must needs be a rough one, for the famines varied in intensity, and the circumstances of the different parts afflicted were different; but without wishing to push the argument too far, and with all reservations made, the following table fairly represents what the expenditure on these famines would have been, had they been treated as that of Behar was treated in 1874 :—

| Year. | Province. | Duration of Famine. | Population severely affected. | Actual cost of Relief. | Expenditure at the assumed rate. |
|---|---|---|---|---|---|
| | | Years. | (Millions.) | (Lakhs of Rupees.) | (Lakhs of Rupees.) |
| 1803 | North-Western Provinces | 1 | 10 | 32 | 353 |
| 1813 | Bombay | 1 | 4 | *Nil* | 141 |
| 1833 | Madras | 1 | 8 | 3 | 282 |
| 1837 | North-Western Provinces and Punjab | 1 | 15 | 118 | 530 |
| 1854 | Madras | 1 | 1¼ | 21 | 44 |
| 1861 | North-Western Provinces and Punjab | 1 | 13 | 57 | 459 |
| 1866 | Madras | 1 | 13 | 25 | 459 |
| | Orissa | 2 | 5 | 127 | 353 |
| | Behar | 1 | 4½ | 2¼ | 159 |
| 1868-69 | North-Western Provinces | 1 | 6½ | 46 | 230 |
| | Ajmir | 2 | ½ | | 35 |
| | Punjab | 1 | 3 | 10 | 106 |
| | Central Provinces | 1 | 4½ | 10 | 159 |
| | Bombay | 1 | 3 | 6 | 106 |
| | | | 91 | 457 | 3,416 |

Whereas 4½ millions sterling actually was spent, more than 34 million sterling would have been spent in relieving famine. The addition of 30 millions to the debt of India would have increased the annual expenditure by a million and a half; and though it is too much to say that the finances could not have borne the strain, still undoubtedly it would have been severely felt.

106. *Error of the forecast: extent and degree of the famine overrated.*—But the premise on which the preceding paragraph is based, *viz.*, that a population of 17 millions was in danger of being visited with severe famine, is one that cannot be altogether accepted. It has been made clear that the forecast of the Local Government was unnecessarily gloomy, and that the estimates of the stocks in reserve, of the crops raised in 1873-74, and of the power of the population to endure scarcity, were much too low. Later inquiries, imperfect as they are, have shown that even in the districts which were hardest hit the deficiency of food was much slighter than had been supposed. The Government of India, in the closing Resolution of 18th February 1875,[2] admitted this to some extent. They wrote—

PARA. 10.—"The anticipation of the effects of the scarcity was found to be somewhat greater than the reality, from two causes. The stock of food in the hands of the people turned out to be larger than was anticipated; and sufficient allowance was not made for the extraordinary exertions which were used by the cultivators to grow a greater quantity than usual of the grain crops which ripen in the autumn. It was impossible to reckon beforehand upon either of these circumstances; but the experience that has now been gained shows, *first*, that where a scarcity follows a fair season considerable supplies of food will probably be in the possession of the people; and, therefore, sufficient time may be

[1] No doubt it may be urged that the greater part of the Bengal expenditure was due to the importation of grain, a policy which in some of the previous famines was unnecessary. But although the arguments of 1873 could hardly have been applied in that year to the Upper Provinces, they would assuredly have been held applicable, by the persons who were convinced by them, to all parts of India, in the years when railway communications were not fully developed; that is, in every previous famine, except that in the North-Western Provinces and Punjab, in 1868-69. Moreover, on the other hand, one measure of relief was cut off from Bengal which has always been applied in other Provinces, *viz.*, remission of revenue: it was impossible to advocate this in Bengal, whereas in some Provinces it had been the chief or only measure of relief, and out of the 457 lakhs of rupees expended on past famines 172 lakhs were remissions of revenue. If the Bengal settlement had not been a permanent one, there can be little doubt (from the precedent of Orissa in 1867) that another two millions would have been added to the Government expenditure. As it was, Rs. 28,649 were remitted in the Santhal District and Rs. 308 in Singhbhum.

[2] B. B. II, 62.

reckoned upon for the purpose of organising the relief which may ultimately be required ; and, *secondly*, that the cultivators of the soil in India are able and willing to make considerable alterations in their agriculture for the sake of increasing the food-supply at the earliest possible moment, by which means the period over which the scarcity would otherwise extend is considerably shortened."

107. *Attempt to frame an ex-post-facto estimate of the real area of the Famine.*—It is impossible now, with the imperfect information which still exists as it did then, to state with precision, or in such a way as to carry conviction, what the limits are within which severe famine, if it existed at all, would probably have been confined; but there are many indications which lead to the conclusion that the area of extreme distress was the basin of rice land lying along the edge of the Tarai, in the north of Champáran, Muzaffarpur, Darbhanga, and Bhagalpur. This is the tract where rice is the prevailing crop, and it was the winter rice alone that failed extensively. Elsewhere it is clear that the purchasing power of the people, and the activity and enterprise of trade, were underrated. In Saran and the southern parts of Champáran and Tirhut there was no catastrophic failure of the crop: in Dinajpur, Purneah, Rangpur, and Bogra the people could hardly be got to accept direct relief even at extravagant rates of pay; all they would consent to do was to buy grain below the market price; and all through the famine these districts were exporting food grains briskly. No emigration existed to more favoured tracts even on the part of those who have no permanent tie to their homes and no share in the village organization. With a very few exceptions, no signs of emaciation were seen. There are many indications which combine to show that in these tracts, at any rate, the pressure of famine was not severely felt.

108. *Importance of an accurate forecast.*—Now this mistaken estimate was responsible for two things: first, for the vast scale of preparations made for the relief of tracts and of whole districts which were not severely affected; secondly, for the doctrine that all tests ought to be abolished, a doctrine which sprung from the belief that in a country where almost every one was famine-stricken there could hardly be such a thing as an unworthy applicant for relief. Thus, on a review of the whole proceedings, the main lesson to be learnt from the history of this famine seems to be the immense importance of a sound and accurate forecast; and in order to secure this, the main and all-essential requisite is a complete system of agricultural statistics based on a field-survey.

109. *Discussion of the policy of importation.*—Even if the forecast had been correct, and the threatened famine as severe as was supposed, there are two leading details of the system of relief, the propriety of which may be canvassed; these are (1) the policy of Government importation, (2) the substitution of personal knowledge for self-acting tests. As to the first, it is difficult and hardly necessary to give an opinion. The opinion of the local officers seems to have been unanimous that in the northern parts of Behar private trade would not have thrown in grain in sufficient quantities to supply the wants of the people. Against this it has been urged that under all the disadvantages of Government competition and its almost monopoly of the transport, Sir G. Campbell did see grain brought by private traders into Darbhanga, and that no greater difficulties existed here than were overcome by the merchants who in 1877 carried grain to the south of Kaladgi and Belgaum, to Harpanhalli in the Bellary District, and to Shimoga in Mysore. But the fact remains that the action of Government itself prevented this question from being brought to the test of experience, and no one can say with certainty what the results would have been had private trade been left to itself. Moreover, it is generally agreed that, now that these northern districts have been opened out by the Darbhanga State Railway and by improved communications, the necessity of Government importation can never recur. That more grain was imported even to North Behar than was necessary, that much was thrown into places commanded by the railway and the river, where private trade might certainly have been relied on, and that the principle of making provision against a possible second failure of the rains was a mistaken one, are matters on which opinions can hardly be said to differ.

110. *The effect of the abolition of tests.*—As to the second point, it may be safely declared that the famine of 1873 does not establish the principle that it is possible to organise a system under which the relieving officers shall be able to judge, solely by personal knowledge, of the wants of the applicants. However excellent and efficient the inspecting establishment was, there is nothing to show that it would not have been desirable for them to employ the test of work as a condition of relief in the case of all who were able to work; and it is obvious that if this had been done it would have left the officials freer to inquire into the circumstances of the residuum who were unable to work. It is admitted that the relieving officers found it impossible to test the reality of the wants of ryots who applied for advances, and yet it is easier to obtain personal

knowledge of the circumstances of men who possess some landed property, than of those who possess none. It is admitted that they could not judge as to rejection or admission by the appearance of the applicants, because, with a few exceptions in March and April, all looked sleek and well-to-do. It is admitted that the wages given on the relief-works were often larger than could be earned in non-famine years, and that the pauper was able to buy more food than the frugal and industrious self-supporting labourer. These considerations, coupled with the fact that a far greater proportion of the population was in receipt of relief than has ever been known before or after, cannot but throw great doubt on the wisdom of the policy pursued; and seem to compel the conclusion that it would have been wiser for the Government to have enforced the old and approved policy of restricting its assistance in the great majority of cases to the giving of employment on large and useful public works.

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## Section II.—North-Western Provinces.

1. *General character of famine tract.*—The North-Western Provinces felt but slightly the effects of the drought which was causing so much suffering in Behar. There were two separate distressed areas. First, the Sub-Himalayan tract in the east of the province, comprising the northern portion of the districts of Gorakhpur and Basti. Here, as in Northern Behar and Bengal, the main crop of the year and the common food of the people is the winter rice, and that crop failed generally for want of rain. Adjoining these two districts, there was also a certain amount of suffering in Ghazipur, a district of very dense population, and where among certain classes of the people poverty is chronic. The second tract includes most of Bundelkhand, that is, Jhansi, Banda, and Hamirpur. The agricultural population of this tract had been struggling with a succession of bad years, which had impoverished landlord and tenant, while the cultivated area had in many parts been seriously diminished by the spread of *kans* grass. Thus the bad autumn harvest of 1873 found the people at the end of their resources. The southern part of Mirzapur, a hilly and thinly-peopled country, may be classed with this tract.

The following table shows the area and population of both the famine tracts:—

| District. | Affected Portion. | |
|---|---|---|
| | Area, Sq. Miles. | Population. |
| Gorakhpur, Northern portion | 2,028 | 686,000 |
| Basti, Northern portion | 1,158 | 601,000 |
| Ghazipur, Eastern portion | 532 | 352,000 |
| Banda | 2,908 | 697,000 |
| Hamirpur | 367 | 95,000 |
| Jhansi | 1,567 | 317,000 |
| Mirzapur (south) | 2,632 | 173,000 |
| Total | 11,192 | 2,921,000 |

2. *Rains of* 1873.—The rainy season of 1873 began late and ended early.[1] Some slight showers fell, after dust-storms, about the middle of June. Then the hot westerly winds set in again, and lasted till the rains broke on the 2nd of July. They ceased early, closing on the 9th September in Banda, and by the 18th of September the rainy season was everywhere at an end. It had been interrupted by several breaks, and the deficiency of rainfall and the effect of its too early cessation were especially felt in the rice-growing eastern districts. The following table compares the rainfall of 1873 in these parts with the average rainfall for a number of years:—

| District. | Rainfall, in Inches. | | |
|---|---|---|---|
| | 1873. | Average. | |
| Benares | 36·26 | 40·49 | Average of 20 years. |
| Gorakhpur | 39·60 | 46·36 | |
| Basti | 23·7 | 49·76 | Average of 10 years. |

[1] Administration Report, N.W.P., 1873–74, pp. 2, 3.

The Benares and Gorakhpur figures for 1873 include the rainfall up to the 1st April 1874, and thus represent the deficiency as less than it really was.

The Gorakhpur district is the only one for which the monthly figures are obtainable. They are as follows:—

| —— | June. | July. | Aug. | Sept. | Oct. | Nov. | Total. |
|---|---|---|---|---|---|---|---|
| 1873 - - | 8·90 | 12·30 | 14·30 | 2·50 | - - | - - | 38 |
| Average - - | 6·48 | 12·92 | 11·79 | 8·68 | 2·76 | 0·23 | 42·86 |

The result of this deficiency of the monsoon was that in all the eastern districts the kharif crop was short, and the rabi crop was sown with unfavourable prospects, and on a smaller area than usual. But where a late winter rice crop is grown, and is followed by a rabi crop of coarse grain, such as grain or pulse, which is the case in the northern parts of Gorakhpur and Basti, the early cessation of rain meant a general failure of the year's crop; and the authorities of the North-Western Provinces, knowing how similar the character of this tract was to the character of that part of Behar in which the expectation of a most grievous famine was then filling the minds of the people, began to make preparations for a somewhat similar calamity.

3. *Good effect of the winter rain.*—Everything, however, depended on the winter rains, which always make the difference between a bad and a good harvest; and this year, the ground having been drier than usual at sowing time, the harvest without them would have been exceptionally poor. The rain held off unusually late, and in January a frost, such as had not been known for years, set in, and continued for some days, and burnt up the pulses, peas, and more delicate crops. "At last, however, the long-delayed rain fell in the first week of February, and the heavy calamity which seemed to be impending was averted. Though too late to do all the good which it might have done had it fallen at the usual time, it was of incalculable benefit, and through its influence a year of high prices was substituted for a year of famine."[1]

4. *Remission and suspension of revenue.*—In the worst part of the Gorakhpur district, the Maharajganj Tahsil, half the rabi instalment of revenue was remitted,[1] and some moderate arrears were allowed to accrue, no one being unduly pressed to pay his revenue in the distressed districts. The remissions in Gorakhpur amounted to Rs. 67,869; besides which over Rs. 30,000 were remitted during this and the following year in the trans-Jumna districts, partly on account of the drought of 1873, and partly because of the impoverished state of that part of the country. Similarly, the excise revenue in this province and also in Oudh fell off considerably; but it is impossible to say what exact sum should be attributed to the effects of the scarcity.

5. *Prices.*—Prices did not, as a rule, range so high as to indicate famine.[2] In Gorakhpur and Basti wheat in March and April sold at 14 seers per rupee, barley and grain being considerably higher. Rice, however, rose to 11 seers in February, and $10\frac{1}{2}$ from April to June, in Gorakhpur; in Basti it was at 9 seers in February and March, and at $8\frac{3}{4}$ in April, May, and June. The ordinary rate would be about double this, or 16 seers per rupee.

6. *Encouragement of private trade.*—It was urged here, as in Behar, that the distressed tracts were in the habit of exporting, not of importing, that no food stocks existed, and no crop had been harvested, and that private trade would not supply the deficiency. Sir W. Muir would not entertain the idea of Government importation, but preferred to stimulate private trade by advances of money. In Gorakhpur advances were made without interest, repayable in a year, to traders who undertook to store grain in specified places, such grain being purchasable by the Government at a price fixed, so as to cover the expenses of the trader; while those who preferred to import grain for sale at their own discretion received advances repayable without interest in six months. The quantity stored under the former plan was 90,865 maunds, and under the latter plan 10,700 maunds were imported. No actual use was, however, made of the stored grain, the capabilities of the country turning out to be greater than was expected; and of the sums thus advanced Rs. 14,200 had to be remitted ultimately, to cover the losses of the traders and the damage done to the grain. Besides these sums, advances were made to zemindars and ryots to buy seed-grain; the amount thus advanced was Rs. 91,470 in Gorakhpur, Rs. 43,209 in Basti, and about Rs. 20,000 in Mirzapur.[3] All this was ultimately recovered.

[1] B. B. II, p. 133. [2] *Ib.* II, pp. 136–7. [3] *Ib.* II, pp. 133 and 140.

7. *Relief-works.—Wages.*—The system on which the Government proposed to deal with the famine was the same as had been adopted in 1861 and 1868:[1] relief-works were to be started to employ the able-bodied poor, and those who were unable to work were to be relieved by private charity, which the State should assist, but should not bear the whole burden. The execution of all relief-works was made over in February 1874 to the Public Works Department;[2] all were to be carried on on the daily wage system, and a Resolution issued on the 10th February fixed the rate of wage. The maximum was to be 1½ annas for a man, 1 anna for a woman, and ½ anna for a child; and below this maximum the rate was to vary with the price of food, so as to be sufficient to enable each person to buy the following quantities:—

| | Flour. | Vegetables. |
|---|---|---|
| | oz. | oz. |
| Adult male - - - | 16 | 4 |
| „ female or child above 10 - | 12 | 2 |
| Child under 10 - - - | 8 | 2 |

Looking at the Gorakhpur and Basti prices of the time, it was ruled that the rate of wage for those districts should be (in the local Gorakhpuri pice, of which 5 go to an anna,) 6 to a man, 4 to a woman, 3 to a child.

In Ghazipur a higher rate was paid than even the maximum sanctioned by Government: men got 1¾ annas, women 1¼ annas, children ¾ anna. In February and April these rates were successively lowered, till in May they were fixed at 1 anna, ¾, and ½ an anna.

8. *Increase of numbers employed.*—During the early months the numbers employed on the relief-works continued low, and when the spring harvest came in they diminished rapidly. In Ghazipur they fell from 3,000 in the end of February to 800 in the middle of April; in Mirzapur from 2,000 in February to 300 in March; in Banda from 7,000 or 8,000 in March to 900 in April; in Gorakhpur and Basti alone there was no decrease. Early in April the numbers were 80,000 in the two districts; and by the beginning of April they had risen to 219,000. One reason for this was, that the area sown with rabi had been so small in those parts.[3]

"But the large and increasing proportion of women and children could not escape notice, and there were considerable doubts as to the extent of the distress which prevailed. On the one hand, it seemed that the relief-works might be popular on account of the difficulty of exacting a full day's labour from the crowds who thronged to them, and the liberty they enjoyed, and on account of the wages being paid in cash at a time when agricultural labour was very slack and there was nothing else for the people to work at. On the other hand, there was the hypothesis that these works were the sole refuge of a famished and despairing population, whose only means of supporting life was by the wages earned on them.

"Sir John Strachey lost no time, after assuming the reins of government, in visiting the distressed districts, in order to form his opinion with the aid of the best local advice. The conclusion he came to was, that, on the whole, the former explanation was the correct one, and that there was not really any such severe distress as to deserve the name of a famine. He decided that it was not advisable to close the works, but that efforts should be made to make the relief more distasteful by exacting a larger tale of work, and that the wages should be reduced to the minimum which would provide subsistence for the labourers. Evidence was adduced that the scale had, until lately, been too high, and that the relief-works had attracted sellers not of necessaries only, but of luxuries. The rates now fixed were on the scale which had been introduced by the Magistrate of Gorakhpur about three weeks previously, the allowance for infants only being lessened by one-half. They were—

| | | |
|---|---|---|
| For a man - - - | 5 | Gorakhpuri pice (or 1 anna). |
| For a woman - - - | 4 | ditto. |
| For a child able to work | 3 | ditto. |
| For an infant - | 1 | ditto. |

"Thus the exclusion of all who were not in need of aid was left to be gradually effected by the low rates of wages, and the strict demand of a fair day's work from every labourer."

One result of this was, that a small number of labourers left the Gorakhpur works and crossed the Gandak to join the relief-works in Champáran, where they received 8 pice instead of 5.[4] There was not, however, any general emigration in spite of the temptation thus offered.

9. *Measures taken to reduce the numbers, and their result.*—Lest any deserving persons should be deprived of relief by these measures, poor-houses were opened, in

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[1] *Ib.* II, p. 138.

[2] *Ib.* II, p. 137. It appears from the reply of Mr. Stoker, then Assistant Magistrate of Gorakhpur, that he considered himself "absolutely prohibited from interfering with or giving any order concerning the works "under the charge of Department Public Works officers." It was not, however, the intention of the Government to lay down any such principle as to the separation of the two Departments.

[3] B. B. II, p. 134.

[4] *Vide* Mr. Stoker's reply to Famine Commission.

which cooked food was provided for all applicants unable to labour, on the condition of residence, and of doing such light work within the enclosure as would be given them; exceptional measures of relief were sanctioned for "pardanashin women," or for others who, on account of caste or other feelings or prejudices, were prevented from accepting the assistance offered on these terms. The change thus made in the system coincided in point of time with an exceptionally early monsoon.[1]

"Towards the end of May, after a few partial showers, the demand for agricultural labour began to make itself felt in Gorakhpur, and from all the works there set in a steady flow of labourers to the fields. On the 30th May rain fell generally throughout the district, and the numbers in daily attendance on relief-works, which had been 89,000 during the last week of the month, sank to 25,000 in the first week of June. The rains had now thoroughly set in, and a few days later the last relief-work was closed, and the three work-houses were opened for the destitute who still claimed assistance."

The following remarks embody the conclusion arrived at by the Lieutenant-Governor as to the reality of the distress and as to the proper measures to be adopted in similar circumstances :—

"These events completely justified the conclusions arrived at by Sir John Strachey on visiting the locality, and they deserve special and prominent record on account of the importance of their bearing on the treatment of future famines. It appears probable that in a slack season of the year the opening of Government relief-works would always attract great crowds of labourers. In a season of considerable pressure, but not of absolute famine, the relief-works in Gorakhpur and Basti were for some weeks daily thronged by more than 200,000 men, women, and children, who found an attraction in the light work, in the liberty of going at night to their houses after attending a sort of vast picnic during the day, and in wages earned at a time when ordinarily they had no employment in the fields and had to live on their harvest savings. But when the wages were cut down to a mere subsistence allowance, when a full day's labour was insisted on, and when the liberty of living at their homes was threatened, these immense crowds melted away as rapidly as they had collected, and it was found that there was hardly any one who really stood in need of relief."

10. *Statistics of the relief-works.*—The returns of the numbers employed were not very carefully kept, and cannot be compiled with absolute accuracy from the official records. The monthly numbers entered in the table below[2] are taken from the report of the Central Committee[3] where they were received from the Public Works Department, but they do not show all the months—only those in which relief was most extensive. On the whole, however, it appears, from a comparison with the casual notices in other reports, that they cannot be much below the mark, though somewhat too low.

| | Average daily number. |
|---|---|
| January (about) - | 2,000 |
| February - | 7,806 |
| March - | 40,996 |
| April - | 133,769 |
| May - | 208,468 |
| June - | 83,150 |
| Total - | 476,189 |

Looking only at the four worst months, the average number employed from March to June was 119,047.

[1] B. B. II, p. 135.

[2] Number of People employed on Relief Works in the North-Western Provinces in 1874.

| District. | January. | February. | March. | April. | May. | June. | Total number employed. | Average number. | Period. | Cost per Head. | Total Cost. | Date of the opening of works. | Date of closing the works. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | c | | | | | | | | Months. | Rs. A. P. | Rs. | | |
| Gorakhpur | — | — | 21,825 | 73,261 | 78,059 | 29,344 | 202,489 | 50,622 | 4 | 1 9 0 | 3,20,444 | End of January - | Middle of June. |
| Basti - | — | 5,000 | 13,000 | 56,697 | 125,908 | 49,935 | 250,540 | 61,385 | 4 | 1 11 4 | 4,28,557 | 22nd January - | 22nd June. |
| Ghazipur - | — | 806 | 1,247 | 647 | 689 | 956 | 4,345 | 869 | 5 | 3 0 3 | 13,116 | Early in February | Last week of July. |
| Mirzapur - | over 2,000 | about 2,000 | 300 | — | 1,300 | — | — | — | — | — | 25,136 | End of December | 21st June. |
| Banda - | — | — | 3,916 | 941 | 329 | 99 | 5,285 | 1,057 | 5 | 2 8 4 | 13,249 | End of January - | End of June. |
| Hamirpur | — | — | — | 1,323 | 1,540 | 1,955 | 4,818 | 1,606 | 3 | 1 4 4 | 6,145 | Beginning of February. | June. |
| Jhansi - | — | — | 708 | 720 | 643 | 861 | 2,932 | 733 | 4 | 2 6 1 | 6,983 | March - - - | 14th July. |
| Jalaun - | Only one work with 180 persons. | | | | | | | | | | | | |
| Total - | — | 7,806 | 40,996 | 133,769 | 208,468 | 83,150 | 470,409 | 94,082 | — | 1 11 9 | 8,16,630 | | |

The last three columns are taken from pp. 138-40.

[3] B. B. II, pp. 157-59.

The total expenditure on wages was Rs. 8,16,630, or Rs. 1-11-5 per head per mensem: as however the real numbers were slightly larger than here shown, the real cost was slightly less.

11. *System of gratuitous relief.*—In February the Lieutenant-Governor (Sir W. Muir) called a meeting in Allahabad to invite the co-operation of public charity. A Central Committee was formed, and subscriptions to the amount of Rs. 64,995 were collected. Local Committees were appointed in the distressed districts, and the system of administering gratuitous relief was as follows:—[1]

"Relief was given in the state of cooked and uncooked food and cash. The cooked and uncooked food consisted chiefly of the cheaper grains, such as dal, bajra, gram, barley, and common rice, and the flower of the *mahua* tree. The sick and infirm under medical direction received more nutritious diet. Relief in cash was distributed principally to *pardanashin* women. The miscellaneous expenditure (where it is not otherwise stated) includes these cash payments. It also includes charges for the construction of poor-houses, for the provision of culinary vessels, firewood, cotton for the employment of those able to spin, and medical assistance and medicines."

12. *Statistics of gratuitous relief.*—The poor-houses started in Gorakhpur and Basti after Sir J. Strachey's visit, and managed under the orders referred to in paragraph 9, were kept up at the charge of Government, and the statistics of the cost of these are not distinctly given. In both districts the number in June was about 800. In Gorakhpur the maximum was reached in the end of July, when 1,500 was on the rolls; they stood at 1,000 in August, and rapidly diminished towards the end of the month; and in the third week of September all these poor-houses were closed. In Basti the number in August was 1,800, in September 1,200; October opened with 550, and by the 21st the poor-houses were closed. Of the other poor-houses, and other forms of gratuitous relief kept up at the expense of public charity, the following are the statistics[2]:—

| District. | 1874. | | | | | | | | | Total Number. | Average Number. | Period. | Average Cost per Head of Rations. | Cost of Rations. | Miscellaneous. | Total Cost. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | February. | March. | April. | May. | June. | July. | August. | September. | October. | | | | | | | |
| | | | | | | | | | | | | Months. | Rs. A. P. | Rs. | Rs. | Rs. |
| Gorakhpur | 1,134 | 1,179 | 1,295 | 981 | 580 | 339 | 244 | 69 | — | 5,821 | 728 | 8 | 1 1 6 | 6,402 | 5,982 | 12,384 |
| Basti | — | 73 | 194 | 380 | 822 | 769 | 666 | 382 | 180 | 3,466 | 433 | 8 | 1 11 10 | 6,015 | 1,968 | 7,983 |
| Ghazipur | 2,338 | 2,379 | 258 | 72 | 84 | 253 | 244 | 257 | 276 | 6,161 | 685 | 9 | 0 13 8 | 5,654 | 742 | 6,396 |
| Banda | 69 | 1,369 | 1,139 | 924 | 496 | 206 | 83 | 51 | 14 | 4,351 | 483 | 9 | 1 1 6 | 4,747 | 2,315 | 7,062 |
| Hamirpur | 164 | 239 | 308 | 438 | 468 | 539 | 698 | 680 | 253 | 3,787 | 421 | 9 | 1 1 6 | 4,143 | 2,387 | 6,530 |
| Jhansi | — | 9 | 12 | 50 | 49 | 38 | — | — | — | 158 | 32 | 5 | 1 4 10 | 208 | — | 208 |
| Allahabad | — | 69 | 287 | 409 | 311 | 22 | — | — | — | 1,098 | 219 | 5 | 1 8 0 | 1,644 | 401 | 2,045 |
| Central Office | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 1,302 | 1,302 |
| Total | 3,705 | 5,317 | 3,493 | 3,254 | 2,810 | 2,166 | 1,935 | 1,439 | 723 | 24,842 | 3,001 | — | 1 2 6 | 28,813 | 15,097 | 43,910 |

Of the balance, Rs. 8,354 were given to sufferers by fire and inundation in different places, and the rest, Rs. 12,460, was invested in Government paper against future contingencies. No contribution was asked for from Government, as the private subscriptions were more than sufficient to meet all the requirements.

13. *Total cost of relief operations.*—The total cost of relief operations of all kinds was Rs. 9,92,923, made up as follows:—

| —— | Number relieved. | Period. | Cost to Government. | Cost to the Public. | Total cost. |
|---|---|---|---|---|---|
| | | Months. | Rs. | Rs. | Rs. |
| Relief-works | 119,047 | 4 | 8,16,630 | — | 8,16,630 |
| Gratuitous relief | 2,760 | 9 | 41,689 | 52,535 | 94,224 |
| Revenue remitted | — | — | 75,497 | — | 75,497 |
| Loss on advances of grain | — | — | 14,200 | — | 14,200 |
| Total | — | — | — | — | 1,00,551 |

Taking the affected population at 3 millions, the cost per head was R. 0-5-6.

[1] B. B. II, p. 154. It appears from the Gorakhpur reply to the Famine Commission that, in that district at least, uncooked food was the rule, and that residence was not insisted on.

[2] Compiled from B. B. II, pp. 160-63.

## Section III.—Oudh.

1. *Famine tract.*—The northern part of the districts of Baraich and Gonda is a rice bearing tract, similar to that which adjoins it in Basti and Gorakhpur, and it was affected in the same way by the failure of the rains in 1873. The area distressed was about 2,900 square miles, with a population of 750,000 :[1] but here too, as in the North-Western Provinces, the good spring harvest of 1874, followed as it was by early and favourable rains, prevented the distress from deepening into famine.

2. *Relief measures—System of relief-works.*—The Government resolved to meet this distress by providing employment on relief-works, and as far as possible to discourage gratuitous relief.[2]

"The Chief Engineer, following the practice that has obtained elsewhere, suggested that Government should utilise the skilled and able-bodied labor which is available in times of distress at a lower wage than usual by employing them on remunerative works under the department, and would have referred all other labourers or distressed classes of the population to the district authorities to be fed by charitable relief. He would allow the professional supervisors of works to administer this charitable relief at poor-houses situate near the works, not as officers of the department, but as agents of the Deputy Commissioner. But it was clear that, under such a system, there would be at least as much scope for corruption and peculation as may exist under a system which employs on works all those who can work. We had not to deal with widespread famine actually existing :—all our efforts were directed to avert it. What concerned us first were the people : the return which we sought was not a good bargain wrung out of the labourers, but the preservation of the population in such a state of health, morally and physically, as to enable them at the proper time to resume their ordinary occupations as if the recent calamitous seasons had not occurred."

It was decided therefore to employ all people who would come to the works, however feeble (even little children who could hardly lift the smallest basket of earth), and to pay the daily wages, fixed at the lowest scale sufficient to provide food. The following table shows the rates as prescribed at first and as lowered afterwards in March, when the increased numbers showed them to be too attractive :—

| | Early rates. | Later rates. |
|---|---|---|
| Skilled diggers - - - | 2 annas - | — |
| Unskilled ditto - - - | 1½ „ - | 1 anna. |
| Carriers (mostly women), - - | 1 anna - | ¾ „ |
| Children - - - - | ¾ „ - | ½ „ |
| Infants - - - - | - - | ¼ „ |

3. *Statistics of relief-works.*—The relief-works were—two irrigation tanks, a drainage channel, the embankment of a river, and the construction and repair of roads. They were for the most part opened in February and were closed in July and August; but the numbers became very small as soon as the rains began in the end of May. In Baraich the highest figures were reached in February, before the lowering of the rates; in Gonda the maximum was reached in May. The average monthly numbers are not recorded, but the following table shows the totals :[3]

| | Total Number employed for one day. | Total cost of labour. | Rate per head per month. | Average number daily. | Period. |
|---|---|---|---|---|---|
| | | Rs. | Rs. | | |
| Gonda - - - - - | 3,593,680 | 182,512 | — | 23,958 | 6 months. |
| Baraich - - - - - | 759,046 | 62,300 | — | 5,060 | 5 „ |
| Fyzabad - - - - - | 57,239 | 2,997 | — | 1,908 | 1 month. |
| Total - - - - | 4,409,965 | 247,809 | 1–11–0 | 30,926 | |

The total cost of the works, including establishment, compensation for land, &c., was Rs, 3,17,097, and the value of the work done at ordinary rates was calculated at Rs. 1,36,604, or 43 per cent, of the expenditure. The rates for earthwork are probably high in these parts, as the actual cost is said to have varied from Rs. 3–12 to Rs. 8 per thousand cubic foot.[4]

4. *Gratuitous relief.*—On gratuitous relief the expenditure was very small. In Fyzabad Rs. 1,114 was spent; and in Gonda a poor-house received 29,871 persons in all, or about 200 daily for five months. Nothing is said as to the system of management in these institutions. The total cost of gratuitous relief is not shown separately. Rs. 27,000 were contributed by the Calcutta Central Committee,[5] but the report does not

[1] B. B. II., p. 168. [2] *Ib.* II., p. 183. [3] *Ib.* II., p. 170.
[4] *Ib.* II., 174 and 207. [5] *Ib.* II., p. 187.

state how this was spent. The Government expended the sum of Rs. 17,903 on miscellaneous charges, which may have been connected with this head, but the details are not given.

5. *Advances, and storage of grain.*—Advances amounting to Rs. 1,25,000 were made to help in importing grain; and the Deputy Commissioner of Gonda laid in a stock of about 37,000 maunds at the cost of Rs. 90,000. It was not used, and the loss on it and on unrecovered advances was expected to be about Rs. 40,000.

6. *Remission of revenue.*—The remissions of revenue were large, amounting to one-fourth of the whole year's demand in Fyzabad.[1] In Gonda one-fourth of the demand of five parganas was remitted; and in the rest the new assessment which would otherwise have been introduced was postponed. In Baraich a part of the revenue was remitted in six parganas and more was suspended.

These remissions, however, were not due to the drought alone; they were partly owing to this cause, but more to the fact that the revised assessment was greatly in excess of what had been taken before and had been imposed too suddenly before the subordinate shares had been adjusted, and partly to a combination of both these causes. The figures are[2] as follows:—

| District. | Remissions due to | | |
|---|---|---|---|
| | Over-assessment. | Drought. | Both causes. |
| | Rs. | Rs. | Rs. |
| Fyzabad - | 4,18,894 | — | — |
| Gonda - - | 2,64,170 | [3] 1,24,212 | 14,610 |
| Baraich - - | — | 22,072 | 51,244 |
| Total - - | 6,83,064 | 1,46,284 | 65,854 |

Perhaps half the figure in the 4th column should be added to column 3 to show the cost of the famine.

7. *Summary.*—The total cost of the relief measures may be thus summarized:—

| —— | Number employed. | Period. | Cost to Government. | Cost to Public. | Total Cost |
|---|---|---|---|---|---|
| | | | Rs. | Rs. | Rs. |
| Relief-works - - - - - - | 30,000 | 5 months. | 3,17,097 | — | 3,17,097 |
| Gratuitous relief and miscellaneous. - - | — | — | 17,903 | 27,000 | 44,903 |
| Loss on advances and on storage of grain. - | — | — | 40,000 | — | 40,000 |
| Revenue remitted. - - - - | — | — | 1,79,211 | — | 1,79,211 |
| Total - - - - - | — | — | — | — | 5,81,211 |

Taking the distressed population at 750,000, the total cost of relief was about Rs. 0–12–6 per head.

C. A. E.

*The 5th July* 1879.

[1] B. B. II, p. 179. [2] Revenue Administration Report, 1872–73. pp. 18–25.
[3] Of this sum, about one lakh of Rupees was remitted in favour of a single rich Talukdar, the Raja of Balrampur.

## Scarcity of 1875-76.

[Compiled from the official Records of the Famine Branch of the (late) Revenue, Agriculture, and Commerce Department.]

1. *Brief History of the Scarcity. The first Warning.*—In the year 1875, again, there was an early cessation of rain in North Behar, and damage was done thereby to the winter rice crop. On the 8th November the Lieutenant-Governor (Sir R. Temple) wrote a minute in which he put the affected population at 17 millions, but trusted that "severity of loss or failure of crop" would be confined to parts of nine districts,* with a population of 8 millions. In these tracts the Bhadoi crop had been good, but the winter rice was believed to have failed to the extent of from a half to two-thirds, and it was anticipated that there would be great loss on the rabi, both from smallness of area and from failure of the seed to germinate because of the dryness of the soil.

* *Viz.*, Champaran (two-thirds).
Darbhanga (six-sevenths).
Mozaffarpur (six-sevenths).
Saran (a half).
Sapul in Bhagalpur.
Gya (part of).
Purneah (part of).
Dinajpur (a third).
Rangpur (a fifth).

2. *The Lieutenant-Governor's Proposals for Relief of Famine.*—On the 12th November, after further communication with the local officers, the Lieutenant-Governor reported that the rabi would probably be only a half crop at best, and might be worse. "In "North Behar the present failure would appear to be nearly as bad as that of 1873." But, on the other hand, the bhadoi crops had been very good, the area of failure was smaller than in 1873, prices were lower, grain dealers more active, crops in the surrounding tracts better, and the stocks in the country larger. The Lieutenant-Governor believed that 300,000 tons would have to be imported for food, about a third of which would be wanted in the more remote parts of North Behar; and that private trade would probably effect this if aided by a railway. Accordingly, he proposed to construct four lines of temporary railway, aggregating 122 miles in length, to lower freights on food-grain, as in 1873, and to establish a steam ferry across the Ganges. The latter proposal was sanctioned, and ultimately one of the railway lines, the branch to Mozaffarpur, was put in hand; but it was sanctioned as a permanent not a temporary undertaking, and on grounds of general expediency as a reproductive work, not especially for famine relief. But the other lines had not been planned or surveyed, nor was it clear that they would ultimately pay for their construction. The loss by rapid construction, *i.e.*, the excess cost if they should be put in hand at once as famine works, was calculated at 36½ lakhs of rupees; and on these grounds they were postponed till the necessity for them should become clearer. Moreover, the Government of India (November 25th) declined to approve the reduction of freight (which had cost Rs. 45,60,000 in 1874), without further and more precise information. They wished to know, in regard to each thana, the population and area, and "as complete a statement "as possible of those leading facts on which the extent and pressure of the famine (if "any) will depend, such as the character of—

"(*a*) the last winter harvest;
"(*b*) the last spring harvest;
"(*c*) the rain crops.
"The present estimated outturn and prospect of—
"(*d*) the coming winter crop;
"(*e*) the coming spring crop.

"The proportional extent to which the several harvests cover the cultivated area of the thana.

"The extent to which the produce of the different harvests, respectively, is supposed to feed the people. The actual prices on the latest date for which the information may be available when the report is submitted of—(1) common rice, (2) lesser millets, (3) Indian corn, at the head-quarters of each thanah, with the corresponding prices on the same date in 1871, 1872, 1873, and 1874.

"The communications of, and carriage available in, the thana, the marts or other commercial centres from which, in the event of famine, it would naturally draw its supplies, and the facilities, or otherwise, that exist for drawing such supplies.

"The character of the population, high caste or low caste, rich or poor, purely agricultural or partly, and if so, in what proportion urban or artizan. The character of the proprietors, large landholders and wealthy, small and poor, absentees or unsympathetic with their people, or likely and able to support and aid them.

"The deliberate opinion of the local officers as to the present condition of the people, as to the extent to which the scarcity is likely to affect them, and as to the nature of remedial measures, if *any*, that are called for.

* * * * * *

"But these purely local reports will necessarily lack, to a certain extent, completeness; they will be based on no common standard. One officer will rate the same degree of failure at a higher or lower figure than another; and to enable the Government of India to form a really just conception of the state of affairs, it seems desirable that a special officer of established ability and experience in such matters should be deputed to visit all the presumably threatened jurisdictions, and after personal inquiry and examination of the local reports above ordered, and conference with these several district officials, planters, and intelligent natives, to report fully his views on the state and prospect of the several tracts, together with all such additional facts as he may have elicited." In accordance with these instructions, two officers, Messrs. Geddes and MacDonnell, were deputed to make a joint inquiry and to report on the questions specified.

3. *Lower Estimate of the Area of Distress.*—On the 2nd December the Lieutenant-Governor summarising the information contained in a long official narrative, dated 30th November, sent up a much more encouraging report. Champaran and Saran, Gya and Purneah, Dinajpur and Rangpur, were now altogether removed from the famine area: the only parts regarding which anxiety need now be felt were* two Sub-divisions of Durbhanga, two of Muzaffarpur, and one of Bhagalpur, with a population of 2,400,000. In these the outturn of the rice crop was now considered to vary from four annas in Madhobani to eight annas in Durbhanga, and the rabi prospects were much better than they had been.

| * District. | Sub-division. | Population. |
|---|---|---|
| Darbhanga | Madhobani | 650,000 |
| | Darbhanga | 250,000 |
| Muzaffarpur | Sitamarhi | 550,000 |
| | Muzaffarpur | 450,000 |
| Bhagalpur | Supul | 500,000 |
| | Total | 2,400,000 |

4. *Mr. MacDonnell's detailed Calculations as to the Loss of the Crops.*—On the 7th December, the Government of Bengal submitted notes prepared by Mr. MacDonnell on the food-supply of these five sub-divisions. In these he calculated on such data as are available in those parts, the ordinary outturn of crops, the outturn for the year 1875–76, and the ordinary consumption and export. His conclusions were as follow. In Durbhanga the injury done to the rice crop had not been severe, and the other crops were good; the food-supply was amply sufficient to provide for the requirements of the people with a considerable surplus for export. In Madhobani, the rice-crop was about one-third of the average, and the rabi would be about a half: at these rates the food-supply would be about 38 lakhs of maunds, and the food consumption, seed-grain, wastage, &c., about 48 lakhs, so that nearly a million maunds would have to be imported, provided the reserve stocks were maintained at about their usual height. In Muzaffarpur, the winter rice being calculated at a quarter, and the rabi at half, an average crop, the food-supply would be 41 lakhs of maunds against local requirements of 65 lakhs. In Sitamarhi, taking the winter rice at five-sixteenths, and the rabi at one-third, of an ordinary harvest, the sub-division would have for its food 44 lakhs of maunds, against requirements of 52 lakhs, and from 500,000 to a million maunds would require to be imported. In Supul the estimate was—winter rice a quarter, rabi half a crop; and the result would be a deficiency of about 8 lakhs of maunds. The forecast may be tabulated thus, Durbhanga being omitted as a tract about which no further anxiety need be anticipated:—

| Sub-Division. | Estimate of Crop of 1875–76. 16 annas = averrge. | | | Anticipated outturn in lakhs of maunds. | Ordinary requirements for Food, Seed, and Wastage in lakhs of maunds. | Deficiency in lakhs of maunds. |
|---|---|---|---|---|---|---|
| | Bhadoi. | Rice. | Rabi. | | | |
| Madhobani | 16 | 5 | 8 | 38 | 48 | 10 |
| Muzaffarpur | 16 | 4 | 8 | 41 | 65 | 24 |
| Sitamarhi | 16 | 5 | 5 | 44 | 52 | 8 |
| Supul | 16 | 4 | 8 | 35 | 42 | 7 |

The deduction from these calculations appears to be that Mozuffarpur was the tract most seriously threatened, and that the total deficiency of food was about five million maunds, or about 140,000 tons of food; but the stocks in hand, aided by reduced consumption on the part of the people, would, no doubt, enable them to exist till the next harvest came in. At this time there was no import by private trade going on, nor would the low prices then current admit of any: rice was selling even then in the most distressed part of Madhobani at 22½ seers per rupee. But the Commissioner of Patna, Mr. Metcalfe, writing at the same time (9th December), gave an alarming account of the position which, he said, closely resembled that of 1866, when "the local "officers took an optimist view of the effects of the drought upon local supplies. No "steps were taken, and the result was that thousands died." Speaking of the normal condition of Tirhut, Champaran, and Saran, he said, "not only is the cultivation left "with an area barely sufficient to raise the food he requires for his family, but in times "of drought, having no margin of cultivation left, he is short of food, as the yield is "below his requirements."

5. *Brighter anticipations in January* 1876.—The next report is contained in Sir R. Temple's minute of 25th January 1876. He said, that in every case the out turn of the winter rice was now considered to have been better than the original estimate, and he illustrated this by the following table:—

| Sub-Division. | Estimate of Winter Rice Crop. | | |
|---|---|---|---|
| | 8th November. | 2nd December. | 25th January. |
| Madhobani - - | 4 | 4 | 5 |
| Darbhanga - - | 6 | 8 | 9 |
| Sitámarhi - - | 2 | 5 | 7 |
| Muzaffarpur - - | 5 | 5 | 7 |
| Supul - - - | 2 | 6 | 6 |

Prices also continued low all over Behar, and it was ascertained that in such districts as Saran, Champaran, Monghyr, and Gya, about which alarm had been felt, the harvest had been very little, if at all, below average.

6. *Commencement of relief measures.*—On the 24th January the Commissioner of Patna reported that he had found cases of distress in the Darbhanga District, the lower classes of labourers being pinched for want of their usual employment in harvesting; he had accordingly appointed 6 relief officers (natives) and opened relief-works in part of Madhobani: gratuitous relief was only to be given in grain, not money, to those unable to work. His instructions to the Relief Officers were that they were to call on "the patwari and gumashta of each village for a list of the labouring people who "subsist entirely by labour, and who have in the present year neither crops nor harvest "work to employ them; to make themselves personally acquainted with the houses "of these people and their physical condition: and the day it was ascertained they had "no longer any food or means to buy food, to send to head-quarters for instructions as "to the relief-work to which the labourers were to be sent." Thus the idea of administering relief on the basis of personal knowledge of the applicants' condition was still, as in 1874, the accepted principle in Behar.

7. *Report by Messrs Geddes and MacDonnell.*—On the 24th January, Messrs. Geddes and MacDonnell, who had been deputed at the end of November to inspect the distressed tracts and collect and compare the information demanded by the Government of India (see paragraph 2) sent up their joint report. It is a production of great ability and of permanent value, not only as showing the frame of mind in which alarmist and sensational reports should be treated, but also on account of the information it gives as to the condition of the Behar ryot, and the historical sketch of the causes which led to his circumstances being so depressed that the slightest seasonal calamity made him an applicant to Government for relief from famine. The report can, however, be but briefly summarised here. They began by showing that while in Sitamarhi the loss of the rice crop had been Sporadic, in Madhobani and Supul it had been more widespread and general, especially in the strip along the Northern Frontier: and they calculated that the outturn of the rice-crop was represented by the figures 7, 5, and 6 annas (or sixteenths) of an average crop respectively. The winter rain so far had been good, and they estimated the coming rabi crop for those 3 sub-divisions at 10, 6, and 12 annas,

respectively. No other sub-division was distressed except these three. Their rabi crop estimates were in most places higher than those of the Collectors and local officers, especially in Sitamarhi: and in justification of this they say—

"In noting this subject we cannot help remembering, that in December 1873 the prospects of the rabi in Behar were reported on as unfavourably as Mr. Worsley reports on them now. Yet the result in almost every district then distressed was that the rabi harvest was in the end a favourable one, so much so as to materially modify the local officers' explanation as to grain requirements. The same anxiety as to grain prospects for the cold weather of 1865–66 proved to be similarly incorrect, so much so that the local officers then went to the other extreme of reckoning too much on the rabi."

They also testify to the activity shown in utilising all means of irrigation both for the rice and the rabi, in sowing a larger area than usual with rabi, and in sowing extra crops like "chena" (a small millet) and potato, which made a material addition to the food-supply of the country.

"Having remarked on exertions to extend the rabi crop in certain parts of North Behar, I feel bound to add, as the result of universal testimony and my own observation, that there has been no sign of that relaxation in energy which some people predicted as the result of the relief measures of 1874. On the contrary, all persons of every shade of opinion have remarked on the exertions made by ryots to save their crops from drought as quite remarkable. Even the Tirhooteea Brahmans, who are usually found fault with in such matters, have been commended this year. Every pond and hole was turned to account, and except in parts of Soopool, where the tanks had, unfortunately, not been well planned, the new tanks, which were started as relief-works in 1874, have proved very serviceable this year. The streams have for the most part been all but useless for irrigation, showing how severe the drought in the Terai has been, and how much the streams had been drawn on up above in Nepaul. But wherever baling from the streams was feasible it has been done, more especially in Sitamarhi and Soopool. In this respect Alapore and Jubdee showed less elasticity. At one place in Sitamarhi we came across rice-fields which had been saved, and rabi which had been started, by water that had been conducted in extemporised drains over at least two miles from the river channel. The Teljooga river, always largely utilized in this way, was last November and December one long series of bunds from the frontier as far down as opposite to Soopool town."

Part of this activity was due to the stimulus afforded by energetic officials. Thus Mr. Metcalf writes:—

"In Sitamarhi the Assistant Magistrate, with very praiseworthy activity, turned out the labouring population along the banks of streams, and, by banking up the waters, irrigated large areas of land on which the villagers were not slow in sowing cold-weather crops."

Applying all the available data as to cultivated area crop, and average outturn and consumption, Mr. MacDonnell calculated that there was an actual deficiency of food-supply for the year amounting to 24,000 tons in Sitamarhi, 29,000 in Madhobani, and 13,000 in Supul. To supply this he strongly recommended that Government should import at least 11,000 tons of food-grain into Madhobani. At the same time the Collector of Mozaffarpur called loudly for an expenditure of 11 lakhs of rupees in Sitamarhi, in the form of relief-works and advances to the cultivators. Mr. Geddes agreed with neither proposal. He argued that, excellent as Mr. MacDonnell's calculations were, they were, after all, but estimates based on very imperfect data, and that other verifications should also be attended to "prices, degree, and direction of popular "anxiety, and other similar gauges of opinion, direct and indirect,"—such as grain robberies, quarrels over the crops, and petty thefts. As to prices, he showed that they were neither abnormally high nor excited, and that there were no indications of alarm among traders. Neither was there any increase of crime, such as ordinarily precedes a scarcity. He was satisfied that private trade, especially if facilitated by measures he proposed for improving roads, making temporary bridges, and improving the bad ferry and toll arrangements, would be sufficiently able to throw in the grain required. With regard to expenditure of money on relief, the report goes on to show, both officers concurring, that Mr. Worsley, the Collector of Muzaffarpur, advocated an expenditure of 4 lakhs in advances to about 12,000 cultivators and 6½ lakhs in relief-works to afford employment to 90,000 people, and about half a lakh of rupees in gratuitous charity. No other officers advocated an outlay of anything at all approaching this sum, and no adequate reasons had been adduced to support the proposal.

"I consider his estimate for Sitamarhi far too high. I am certain that it cannot be afforded with justice to other parts of Behar, not to say India. Not that this would be a sufficient reason for withholding the expenditure if so extensive disbursements were necessary in order to save life. But with all respect for Mr. Worsley, as an officer whom I know to be earnestly solicitous for his district, I submit that these measures are not necessary. And it is a legitimate means of verifying to refer to other parts of India which one knows and ask one's self 'could the Government reasonably be asked to 'afford a similar measure of relief over every other tract in like condition to Sitamarhi.'

"I venture to predict that Mr. Worsley's good sense on mature reflection would answer 'No.' I certainly make that answer now unhesitatingly. The present year is nothing like 1874. This year

the serious deficiency or absolute failure measures itself by occasional patches, not as in 1874 by pergunnahs. If one answers 'Yes' to the test question just proposed, one must be prepared to advocate expenditure on the scale of lakhs of rupees every other year up and down the Peninsula. Suppose, for a moment, we could, like the magician of the Arabian Nights, transport Sitamarhi with its crops, recent and prospective, and its existing resources,—suppose we could plant all this down in South Gya, South Shahabad, in Orissa, or further south. The new neighbours, on opening their eyes on Sitamarhi, and seeing the variety of crop, the extensive rabi, the frequent rahur, the not infrequent sugarcane, the numerous roads everywhere, would certainly think the Sitamarhi population much favoured above themselves in getting 40,000*l.* in loans to agriculturists at only 6 per cent. interest, while some 40,000*l.* is already outstanding at no interest, 65,000*l.* in wages to labourers, and nevertheless only 3,600*l.* in charity."

The condition of the ryots was no doubt extremely bad; but this, in a most interesting section of the report, Messrs. Geddes and MacDonnell went on to show was due to the peculiar tenures and customs of the country, to the infamous rack-renting, to the monstrous perversion of the law of distraint, and to the short leases given to middlemen by large landowners. If any relief were needed by the ryots in consequence of the state into which they had been brought, it should be given mainly at the expense of the rack-renters who were the guilty cause of it. A large part of the distressed area belonged to the Darbhanga Raj, the estate of a minor which was managed, and as shown in the report very ill-managed, by a military officer under the orders of Government; here they suggested large reforms of administrative system, a great reduction of rents all round, a temporary suspension of rent-collection in the parts where there had been extensive failure, and liberality in relief so as to set an example to other zemindars. Lastly, they recommend that the outstanding balances of advances made in 1874 should not for the present be collected, and that employment should be offered to the distressed by opening relief-works on a moderate scale, especially in Madhobani.

8. *Conclusions drawn from the Report.*—This report was forwarded with a minute of the Lieutenant-Governor, dated 3rd February, which dwelt mainly on the questions it had raised as to landed tenures, the relations of classes, the danger of agrarian disturbances, and the necessity of a change both in the law, and the administration of the law. With these questions, important as they are, the present sketch is not concerned to deal. The Government of India, replying on the 12th April observed with satisfaction that the prbability of distress had at first been consideraly overrated, that the application[1] for a large expenditure in Sitamarhi had been disposed of by the arguments used by Messrs. Geddes and MacDonnell, while Mr. MacDonnell's opinion as to the necessity of Government importation had been proved enormous by the events, since at the time of writing, no scarcity of food existed, and food-grains were selling at from 35 to 40 seers per rupee, a much lower price than at the same time in the previous year. It is stated[2] that the amount by which Mr. MacDonnell estimated the food-supply of Madhobani to be deficient, 29,000 tons, was actually imported by private trade alone.

9. *Summary of results and cost of relief measures.*—It only remains to gather up the scattered records which show the nature and cost of the relief measures which were carried on from the time they were commenced by the Commissioner's orders in January, till the distress was officially declared to be closed in the end of August. They were very limited in extent. In Muzaffarpur it appears that, notwithstanding the immense estimates made by the Collector for the relief of Sitamarhi, nothing whatever was done beyond the entertaining of three special officers. In Darbhanga relief was partly carried on at the expense of Government, partly at the expense of the Raja, in villages belonging to that estate. At the end of May there were 7,783 persons on gratuitous relief, and 6,500 were employed on small relief-works, village roads and tanks. In July the number in receipt of gratuitous relief, was 11,151 and the number employed on works was 9,017. After this the numbers appear to have fallen rapidly and the relief-works were closed on the 15th August. The total cost was about Rs. 31,000 to Government

[1] Mr. Worsley's reply to the Famine Commission shows that he entirely agreed in this:—

"In 1874, Seetamurhee Sub-division suffered famine from failures of harvests scarcely more extensive than the failures which occurred in 1875-76. In the latter year, owing to large importations of food (some 15 lakhs of maunds being imported to the district), very low prices and an excellent mango season, the people of Seetamurhee Sub-division managed to support themselves without any assistance from the Government. In 1875-76 the outturns of the three harvests in that sub-divsion were *bhadoi* 8 annas, *aghani* 5 annas, and *rabi* 8 annas. The outturn of the *aghani* harvest was ascertained by a village to village enquiry made by selected native officers and by myself. On 15th December 1875, I estimated that 152,300 persons of the agricultural and labouring classes would require assistance for three or four months in 1876, and that 5,000 paupers would require charitable relief; but as I have already stated, a combination of favourable circumstances subsequently upset all my calculations."

[2] Mr. Finucane. Reply to Famine Commission.

and about Rs. 1,33,000 to the estate of the Darbhanga Raj. It fell under the following heads[1]:—

| | Rs. |
|---|---|
| Establishment | 12,593 |
| Cost of grain (gratuitous) | 65,539 |
| Miscellaneous | 2,375 |
| Cost of relief-works | 83,701 |
| Total | 1,64,208 |

10. *Lesson taught by the narrative of this scarcity.*—The lesson mainly to be learnt from this narrative is the importance of agricultural knowledge and the danger of an erroneous forecast. It is impossible to conceive anything more absolutely incorrect than the information on which Sir R. Temple, basing his warning letter of November 8th, asked for the commencement of relief measures which would have probably cost the State more than a million of money. Entire districts, which were then declared to be severely affected, turned out ultimately to have a harvest nearly equal to the average. Even in the small residuum of territory in which some loss of crop did ensue, prices continued throughout to be more than usully easy; and the officer who had asked with vehement insistance for leave to spend 110,000 on relief, actually found no occasion to spend a penny. There are three causes to which these mistakes seem mainly attributable. One is the alarmist frame of mind in which the local officers had been left by the lavish expenditure of 1874, and their relaxed attitude as regards the economical treatment of public funds. The second is their want of practical agricultural knowledge, and their readiness to believe that the slightest seasonal irregularity would ruin the winter rice crop. The third and most important cause (for to it the second, and to some extent the first cause also were mainly due) is the want of a field survey and of accurate statistical knowledge of areas, of corps, of tenures, of numbers, of all the facts which go to make up an understanding of the great industry of the country. And the report by Messrs. Geddes and MacDonnell shows that this want of accurate knowledge is not only responsible for ignorance when scarcity is or is not impending, but it is also the main factor in the administrative ignorance and mismanagement which have permitted class to be set against class, and the once prosperous Behar ryot to become one of the most depressed and miserable classes in British India.

12*th August* 1879. C. A. E.

## FAMINE OF 1876–77.

### Bombay.

[Materials: Three notes on the general policy of the Governments, &c., by General Sir M. Kennedy, dated 18th December 1876, and 28th April 1877, and by Colonel Merriman, dated 22nd December 1877 (referred to as K. I, K. II, or M.); closing Minute by His Excellency Sir R. Temple. dated 24th December 1877 (T.); Minute by Honourable Mr. Gibbs, 29th December 1877 (G.); Weekly Progress Reports by the Bombay Government; Official Records of the Famine Department of the Government of India (F. B.); Parliamentary Blue-Book on the Famine of 1876-77 (B.B.); and replies sent to the Famine Commission and evidence taken by them.]

1. *Causes of the Famine.*—The season of 1875 had been an average one. The monsoon of 1876 opened at about the usual time, but the rain fell scantily and irregularly up to the end of August, and then ceased prematurely,[2] hardly any falling in September or October; the consequence of this was a very general failure of the kharif, and inability to sow the rabi crop through the dryness of the soil. The following table[3]

[1] Bengal reply (Mr. Toynbee) to Famine Commission, page 17.
[2] K. I. para. 3.
[3] Meteorol. Reports, 1876 and 1877.

shows the monthly figures, gauged in the rainy months of 1876 and 1877, as compared with the average rainfall of those months :—

| District. | June. | | July. | | August. | | September. | | October. | | Total of 5 Months. | | June. | July. | August. | Sept. | Oct. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1876. | Average. | 1876. | Average. | 1876. | Average. | 1876. | Average. | 1876. | Average. | 1876. | Average. | 1877. | 1877. | 1877. | 1877. | 1877. |
| Khandesh (Dhulia) - | 5·59 | 3·98 | 3·64 | 3·39 | 2·80 | 3·95 | 9·70 | 2·85 | — | 1·52 | 12·93 | 15·69 | 3·46 | 2·69 | 10·22 | 1·99 | 1·40 |
| Nasik - - - | 1·54 | 5·62 | 9·52 | 6·66 | 5·65 | 5·08 | 0·80 | 3·58 | — | 3·98 | 17·51 | 24·92 | 4·42 | 2·98 | 1·27 | 5·89 | 4·18 |
| Ahmednagar - - | 3·24 | 5·22 | 2·30 | 3·03 | 1·28 | 4.03 | 1·82 | 6·26 | 0·09 | 2·87 | 8·73 | 21·41 | 9·93 | 0·49 | 3·63 | 4·51 | 2·73 |
| Poona - - - | 3·93 | 5·90 | 6·05 | 6·65 | 3·18 | 4·30 | 1·14 | 4·10 | 0·73 | 3·91 | 15·03 | 24·86 | 8·85 | 1·42 | 1·38 | 4·68 | 2·95 |
| Sholapur - - | 2·05 | 4·49 | 2·36 | 4·19 | 3·60 | 5·03 | 0·54 | 6·09 | 0·26 | 3·35 | 8·81 | 23·15 | 8·40 | 3·76 | 5·75 | 10·86 | 3·79 |
| Satara - - - | 4·72 | 7·76 | 24·39 | 12·76 | 4·16 | 7·42 | 0·32 | 4·09 | — | 3·50 | 33·59 | 35·53 | 4·11 | 4·59 | 4·66 | 8·41 | 6·42 |
| Kaladgi (Bijapore) - | 2·13 | 4·07 | 0·59 | 1·88 | 0·25 | 3·96 | 0·74 | 4·90 | — | 3·58 | 3·71 | 18·39 | 4·98 | 2·24 | 4·23 | 13·78 | 8·77 |
| Belgaum - - - | 5·35 | 9·79 | 21·11 | 14·63 | 2·25 | 8·79 | 1·94 | 3·35 | 0·97 | 4·49 | 31·62 | 41·05 | 16·43 | 3·12 | 7·69 | 6·63 | 7·42 |
| Dharwar - - - | 1·58 | 5·65 | 7 | 5·78 | 0·81 | 5·05 | 0·53 | 3·27 | 0·40 | 5·77 | 10·32 | 25·52 | 4·89 | 0·76 | 3·15 | 10·95 | 8·58 |
| Total - - | 30·13 | 52·48 | 76·96 | 58.97 | 23·98 | 47·61 | 8·53 | 38·49 | 2·45 | 32·97 | | | | | | | |
| Percentage difference - | —42 | | +30 | | —50 | | —77 | | —93 | | | | | | | | |

From the figures it appears that the failure in the Kaladgi district was far the most intense, Sholapur, Dharwar and Ahmednagar coming next in order: Khandesh, Nasik and Poona had fair average rains till the end of August, but after that month their supply was very short. Satara and Belgaum had an excessively heavy downpour in July, and very little after that time.

2. *The first alarm.*—The first alarm was given by the Collectors of Khandesh and Sholapur in the end of August, and relief-works were opened in those districts early in September, but the rain of September, though it registered a trifling amount, seems to have fallen very favourably in Khandesh[1] and materially improved the position of that district. In the course of September, it became apparent that famine was impending in all the southern districts, and the first council of the Bombay Government was held on the 12th October.[2] The following principles were then laid down as to the administration of relief:—

(1.) That Government should not become a purchaser of grain, but should trust to private trade doing all that is needful.

(2.) That, wherever practicable, persons requiring assistance should be employed on relief-works of considerable magnitude, such as had been well examined and approved, and which would eventually prove useful; while isolated works of a trifling nature should, as far as possible form exceptions to this rule.

(3.) That each Collector should be granted Rs. 25,000 for preserving the lives of those who were too infirm to work.

3. *Dispute as to the principle of opening large works.*—At this time there existed, and continued for about two months, an unfortunate difference between the Government of Bombay and the Supreme Government, in respect to the character of the relief-works that should be adopted. The Government of Bombay advocated the commencement of large works, especially of the Dhond-Man-mar Railway, and some of the important irrigation schemes which have been prepared by Colonel Fife. The Government of India discouraged these and upheld the system of opening small and scattered works, which should not involve the Government in a large expenditure, provided the anticipated famine should not turn out to be very severe. "It is an established principle that those "works should be selected, as far as practicable, which can be completed, or far advanced "towards completion, by the outlay which the scarcity demands."[3] Judged by this test, the railway, the Nira canal, and a road down the Amba ghât to the Konkan, could not be sanctioned, but tank clearances and repairs of roads were looked on favourably, and the sentiment was approved that it was inexpedient to collect large gangs away from their homes on large works. Special attention was drawn to the Resolution of February 18th, 1875 (winding up the Bengal Famine of 1874), and particularly to those paragraphs which bore on the propriety of obtaining complete reports and forecasts from the distressed area, of strengthening the district establishments, of watching the supply of food, and, in the last resource, of importing it from a distance, and of lowering the railway freight for food-grains. The Bombay Government postponed the railway, but persevered in their demand for the initiation of large and remunerative undertakings, in preference to small relief-works scattered over the country; and acting on the discretion given them, started several of these larger works on their own authority, "feeling sure "that when the subject had been more fully considered, their action would be approved, "and it would be admitted that they could not have acted otherwise without incurring

[1] K. I, para. 4. [2] G. para. 4. [3] F. B., 25th October 1876.

"a very grave responsibility, or possibly endangering the lives of Her Majesty's subjects."[1] After the matter had been discussed for some time, the Viceroy accompanied by Sir J. Strachey visited Bombay in December 1876, and the action of that Government, together with the principles on which it was based, was entirely approved and sanctioned.

4. *Earliest estimate of the extent of distress.*—The first estimate[2] made of the requirements of future relief was (in the middle of October) that about 500,000 persons would require support for a period of about eight months. In November, the extent of the area affected by drought was more accurately known. It was ascertained that the distress would be confined to nine districts, with a population of eight millions. Of the ninety-one talukas these districts contained, in twenty-one the failure was almost entire, and in fifty-nine more it exceeded half the usual crop. Sholapur, Kaladgi, and Dharwar were the worst districts, then Belgaum and Poona; in Ahmednagar some talukas were well, and some ill off; in Khandesh and Nasik the loss was about a half, and Satara had suffered least of all. It was estimated that about a million of people, or 20 per cent. of the entire population, would at the worst season come on the hands of Government, and that 140 lakhs of rupees would be expended on relief, while 66 lakhs of land-revenue would have to be remitted.[3] Prices had gone up very suddenly in October, when the alarm first became general (millet rising to 10 lbs. per rupee in Kaladgi, and 14 lbs. in Sholapur), but they steadied, and fell again in November and December, when a large import trade set in. At the end of December millet fetched 17½ lbs. per rupee in Kaladgi, about 20 lbs. in most of the other distressed districts, and 30 lbs. in Ahmednagar. The sum of Rs. 25,000 was placed with the Collectors of the seven worst districts to provide for the feeble and infirm poor and for indigent people incapable of performing work, but the reliance of the Government was mainly on relief-works, and at the end of December about 250,000 people were employed on these.

5. *Estimates of probable numbers on relief.*—Two other estimates were made of the number of persons likely to be on the hands of Government, besides that made by the Bombay Government in November: of these one was framed by Sir R. Temple in January, and one by the District officers in the reports called for by the Government of India and reviewed in February. They may be compared thus:—

| | Bombay Government (November). | Sir R. Temple (January). | District officers (January). |
|---|---|---|---|
| December | 200,000 | — | — |
| January | — | — | — |
| February | 450,000 | — | — |
| March | 750,000 | 540,000 | 677,500 |
| April | — | — | — |
| May | 1,000,000 | 870,000 | 863,220 |
| June | — | — | — |
| July | 300,000 | 340,000 | 509,370 |
| August | — | — | — |

The data for these calculations seem, however, to have been very slight; they ranged, according to the severity of the failure, and the individual views of the officers who framed them, from 2 to about 30 per cent. of the total population of the different talukas.

6. *Detailed estimate as to the extent of distress and fore-cast for the future.*—On the 30th November, the Government of India called for a complete report regarding the distressed districts, and specified the following details of information as necessary to present a complete picture of the present condition and forecast of the future.[4]

(*a.*) A careful estimate of the amount (if any) of the crop which has been saved, calculated in annas, on the assumption of an average yield being represented by 12 annas: kharif and rabi should be shown separately. If there be any prospect of further sowings, it should be mentioned.
(*b.*) An estimate as close as may at the time be practicable, of the amount of revenue to be remitted.
(*c.*) Information as to the mortality, past and anticipated, among cattle and agricultural stock, the measures already adopted by Government and the people, their results, and suggestions for the future.

[1] K. I., para. 24. [2] K. I., para. 17. [3] F. B., January 1877, p. 16. [4] F. B., p. 247.

(*d.*) The nature of the water-supply, extent of its failure, further anticipated failure up to next rains, and remedial measures possible, if any.

(*e.*) The course of prices weekly of each of the principal food-grains from October 1st up to the date of report in each case, and six years' averages.

(*f.*) The local stocks, as far as ascertainable; the centres, railway stations, or otherwise, whence further supplies are being, or may be, drawn; and the probability of private enterprise being sufficient to maintain them; as also of a fall in prices owing to ample importation.

(*g.*) The character of the population—whether high or low caste, poor or well-to-do, purely or only partly agricultural, and if the latter, in what proportion urban or artisan; also the character of the landholders—whether large, wealthy, able to aid their tenants and likely to do so, or the reverse.

(*h.*) The movements of the people: how far emigration has taken place, and with what results (have the people bettered themselves, or merely gone elsewhere to starve, or are they returning), and whether further emigration is probable.

(*i.*) The relief-works already started, their sufficiency or otherwise, and the further works which are considered practicable, arranged in the order of their necessity.

(*j.*) The nature and amount of charitable relief given to travellers, and to the aged, infirm, &c., who are unable to work.

(*k.*) The number of persons whom the Government has on its hands at date of report, for relief (1) by works, (2) by charitable measures, and the number roughly estimated which it is likely to have on its hands on March 1st, May 1st and July 1st.

Adding that the above information should be given for each taluka separately, and should be in the first instance prepared by the mamlatdars, the permission already given to place them on special duty being freely availed of for the purpose. The Assistant or Deputy Collector in charge should test, verify, or supplement the statements of each mamlatdar, and then submit *as his own*, and in his own language, a complete report for the taluka on the points indicated with full and free expression of his own opinions. Each taluka report should be passed on by the Collector with his remarks to the Commissioner, and by him similarly to the Bombay Government, who will forward it to this Department. No report of any taluka should be detained anywhere, because others have not come to hand, and the whole of the reports should have reached the Government of India by the 15th of January next.

These reports were received at various dates, between the 17th January and 12th February, and were reviewed by the Government of India on the 21st February.[1] Of the ninety-three sub-divisions of the nine affected districts, six had reaped a full average crop, and in twenty-four the harvest was above the average. The following table shows the detailed estimate, sixteen annas being taken as the measure of an average crop:—

| District. | Talukas in which the crop had been. | | | | | | Average outturn @ 16 to a taluka. | Actual outturn of crop. | Per cent. of actual to average. |
|---|---|---|---|---|---|---|---|---|---|
| | Over a half. | Half. | A third. | A quarter. | A sixth. | *Nil.* | | | |
| Khandesh - - | 9 | 4 | 6 | — | — | — | 304 | 184 | 60·5 |
| Nasik - - - | 4 | 4 | 2 | 1 | — | — | 176 | 90 | 51·1 |
| Ahmednagar - - | 3 | 2 | 3 | 1 | 1 | 1 | 176 | 71 | 40·2 |
| Poona - - - | — | 3 | 2 | 1 | — | 2 | 128 | 39 | 30·2 |
| Sholapur - - | — | — | — | 1 | — | 6 | 112 | 4 | 3·6 |
| Satara - - - | 7 | 1 | 1 | 1 | 1 | — | 176 | 110 | 62·3 |
| Kaladgi - - - | — | — | — | 1 | 1 | 6 | 128 | 6 | 5·2 |
| Belgaum - - | 1 | 2 | 1 | — | — | 3 | 112 | 32 | 28·6 |
| Dharwar - - | — | 1 | 3 | 2 | 2 | 3 | 176 | 37 | 21·6 |
| Total - - | 24 | 17 | 18 | 8 | 5 | 21 | 1,488 | 573 | 38·5 |

The deduction from this was that in all the nine districts taken together the crop had been rather above a third of an average harvest; but putting aside the three districts, Khandesh, Nasik and Satara, in which the crop had been more than a half, the outturn in the remaining five districts was only 22·7 per cent., or less than a quarter crop, and in the two districts of Sholapur and Kaladgi it amounted to almost absolute failure. With regard to cattle, it was observed that they had been driven away in great masses to the ghâts, and other accessible pastures, and it was hoped that in this way the most valuable animals would be saved. The people too had emigrated in large numbers, amounting to about 670,000 or 13·5 per cent. of the whole population,[2] to the Nizam's territory, Berar, and the Western Ghâts. Prices were still very moderate, and had only reached what might be called famine rates (or less than 10 seers per rupee) in two or three districts.

[1] B. B. III, p. 198.

[2] A special census taken in the Indapur Taluka, Poona District, in November or December, found that out of 67,000 persons 40,300 had emigrated, taking with them 31,445 cattle out of a total number of 44,000 (Bombay Summary for week ending December 22nd).

7. *Relation of food-crop to food requirements.*—It is impossible in the existing state of agricultural statistics in Bombay to quantify these figures with any precision, so as to show what is the actual outturn of food-grain which the estimates represent, and what relation it bears to the food requirements of the country. The following however is offered as an attempt to make a rough approximation to the facts represented :—[1]

| | Ordinary area under food crop; average of 3 years 1873–76. | Ordinary outturn at 380 lbs. per acre. | Food-crop area of 1876–77. | Estimated ratio of actual to average crop. | Outturn at ratio of preceding column. |
|---|---|---|---|---|---|
| | Acres. | Mds. | Acres. | | Mds. |
| Khandesh | 1,423 | 6,760 | 1,516 | 60 | 4,056 |
| Nasik | 1,275 | 4,956 | 1,238 | 51 | 2,527 |
| Ahmednagar | 2,353 | 11,180 | 1,715 | 40 | 4,472 |
| Poona | 1,533 | 7,284 | 933 | 30 | 2,185 |
| Sholapur | 1,821 | 8,652 | 650 | 4 | 259 |
| Kaladgi | 2,113 | 9,880 | 700 | 5 | 494 |
| Satara | 1,540 | 7,333 | 1,440 | 62 | 4,546 |
| Belgaum | 1,446 | 7,040 | 1,186 | 28 | 1,971 |
| Dharwar | 1,121 | 5,300 | 994 | 21 | 1,113 |
| Total | 14,625 | 69,465 | 10,372 | 31 | 21,623 |

| | Mds. |
|---|---|
| The population of these districts, eight millions of people ordinarily require, at $5\frac{3}{4}$ maunds per head per annum | 46,000,000 |
| Seed-grain | 4,500,000 |
| Cattle food | 5,000,000 |
| Wastage | 3,500,000 |
| Total | 59,000,000 |

Applying to these districts the rate of produce per acre which has been estimated for the whole Presidency (and which is too high because these are among the poorest of its districts), the ordinary outturn of food-grain in the year would be 69,000,000 maunds, leaving a surplus of 10,000,000 maunds above the requirements of the people. In the year 1876-77 the first effect of the drought was to bring down the cultivated area by four million acres, or 30 per cent.; so that if the crop on the cultivated land had been an average one, the outturn would still have been only just enough for the food of the people; but when the further reduction in the outturn is taken into consideration, it is found that the total quantity of food produced is only 21,623,000 maunds, or hardly half the amount required for food alone. Thus the total loss to the agriculturists from the failure of this one food-crop was about 42 millions of maunds, or $1\frac{1}{2}$ million tons, or about 10 millions sterling at ordinary prices. Assuming that the people would in the course of the famine (though not immediately) reduce their daily consumption of food to 1 lb. a day, or $4\frac{1}{2}$ maunds per head per annum, and making a further allowance for deaths and emigration, the minimum estimate for human consumption would be about 35 million maunds, or nearly $13\frac{1}{2}$ million maunds more than was actually produced. Adding in, for seed-grain and wastage, some 6 million maunds, the deficiency was 19,400,000 maunds, or nearly 700,000 tons. We know that the importation of food-grain by rail and sea was 434,000 tons, and the balance will be made up, if we assume that there were in reserve 266,000 tons of food-stock at the beginning of the famine, or about two month's consumption at ordinary rates.

8. *Area and population of the Famine Tract.*—With regard to the Native States comprised in the effected portion of the Bombay Presidency, it was impossible to obtain the same accurate information as to the character of the crop in each sub-division: but reports were received[2] showing that in Akalkote, Jath and Phaltan the failure had been almost as complete as in the adjoining Sholapur and Kaladgi districts; in Kolhapur and the Southern Mahratta States about half the area had suffered severely. Adding these

[1] In columns 2, 3, 4, and 6, three 0's omitted. The area cultivated, in columns 2 and 4, is taken from the Bombay Statement No. 17 H, which refers to Government Ryotwari lands—a proportionate quantity being added for Inam land paying quitrent as explained in my Note on Agricultural Statistics.

[2] B. B. III, p. 435.

to the British districts, the following table shows the total area and population of the affected tract, and of the parts most severely visited by famine :—

| District. | Total affected. | | Severely affected. | |
|---|---|---|---|---|
| | Area. | Population. | Area. | Population. |
| | Sq. miles. | | Sq. miles. | |
| Khandesh | 10,162 | 1,028,642 | 5,500 | 646,944 |
| Nasik | 8,113 | 722,252 | 2,000 | 250,000 |
| Ahmednagar | 6,647 | 773,938 | 5,350 | 640,000 |
| Poona | 5,099 | 907,235 | 2,500 | 318,601 |
| Sholapur | 4,496 | 718,034 | 4,496 | 718,034 |
| Satara | 4,988 | 1,061,022 | 2,682 | 461,000 |
| Kaladgi | 5,695 | 816,037 | 5,695 | 816,037 |
| Belgaum | 4,591 | 938,750 | 2,660 | 501,000 |
| Dharwar | 4,564 | 988,037 | 3,000 | 630,000 |
| Total British districts | 54,355 | 7,963,927 | 33,873 | 4,981,616 |
| Native States | 9,708 | 2,073,066 | 4,804 | 847,848 |
| Grand Total | 64,063 | 10,037,000 | 38,677 | 5,830,000 |

9. *Instructions to Sir R. Temple.*—On the 5th January the Government of India[1] appointed Sir R. Temple as their delegate, on a special mission to visit the Presidencies of Bombay and Madras, "for the purpose of inspecting the distressed districts, and "communicating personally with the two Governments concerning the measures which "are being carried out, and which will have to be carried out, for the relief of distress, "and of offering for their consideration any suggestions which he may deem suitable." The instructions given him form an important turning point in the history of famine administration, and may be briefly summarised thus.[2] While Government would spare no effort consistent with the resources of the State for the prevention of deaths from famine, and of extreme suffering, it would not attempt the task of preventing all suffering, and of giving general relief to the poorer classes of the community. "Even for an object "of such paramount importance as the preservation of life, it is obvious that there are "limits which are imposed upon us by the facts with which we have to deal." It was essential to practise severe economy, and to declare that the task of saving life irrespective of cost is beyond the power of Government. It was however believed that efficient measures of relief were possible without disastrous expenditure. The first thing was to settle the principles on which relief should be given. There were then $1\frac{1}{4}$ millions in receipt of relief in Madras, and 287,000 in Bombay; but the mere collection of enormous numbers was no proof of serious suffering. If relief-works are carried out on wrong principles; if labour be not strictly exacted; if proper supervision be wanting and people obtain wages for inadequate work, the numbers in receipt of relief become overwhelming, and the population becomes demoralised. With regard to the character of relief-works it was said that—[3]

> Small local works which, if well supervised and selected, may be useful as a purely tentative measure before the probable character and extent of a threatened scarcity can be ascertained, become insufficient and unsuitable as soon as it is clear that there will be serious and widespread distress. Large works should then be undertaken where large gangs of labourers can be employed with adequate labour tests. These works must, whenever possible, be of a permanently useful and remunerative character, and in some cases it is easier and wiser to carry people to works than food to people. Those unfit for hard labour can be employed in poor-houses or on easy work near their homes.

The duty of non-interference with private trade was laid down as a leading principle; but it was pointed out that purchases by public tender for the supply of food to gangs of labourers were quite unobjectionable; that in certain localities at a distance from the railway, and from large markets, it might be requisite for Government to intervene by making purchases at the nearest local depôt to which the trade will convey the grain; and that, in such cases, where trade is not active, the intervention of Government may tend to facilitate rather than discourage the importation of grain by giving confidence to the traders. Lastly, the opinion was expressed (in confirmation of which the Secretary of State's despatch of 25th November 1875 was quoted) that every province should, as

[1] B. B. II, p. 3. [2] F. B., January 1877, pp. 33-9. [3] F. B., January 1877, p. 39.

far as practicable, be held responsible for meeting the cost of its own famines, and that the main portion of the cost of the public works which protect the country against famine and add greatly to its wealth, should be borne by the people protected and benefited, rather than by the general tax-payer. In his reply dated 15th March, the Secretary of State approved these instructions, and added the following remarks[1]:—

The object of saving life is undoubtedly paramount to all other considerations. But it is essential that in pursuing this end your officers should sedulously guard against the danger of inducing the population to rely upon Government aid rather than upon their own industry and thrift. In the interests of the distressed population itself, as well as of the tax-payers generally, you are bound to adopt precautions against indolence or imposition, similar, so far as the circumstances of India will permit, to those with which in this country it has always been found necessary to protect the distribution of public relief from abuse.

10. *His first visit in January.*—Sir R. Temple travelled through the Bombay Presidency between the 8th and 12th January 1877, stopping at Nasik and Sholapur, and then passed on through Hyderabad to Madras. He recorded in three minutes his impressions regarding the state of things then existing, and his recommendations for the future. In his first minute[2] he showed that in Khandesh and Nasik there was no prospect of severe distress, though in some parts of these districts the loss had been considerable, but the crops were fair in many parts and were good in the neighbouring districts of Nimar and Berar. His next minute,[3] on the southern districts, revealed a far more serious state of things. In Kaladgi and Sholapur the loss of crop had been almost absolute, only one-sixteenth of the usual harvest being saved. In half of Ahmednagar and Poona, and in one-third of Satara, Belgaum, and Dharwar, the crops had been totally or almost totally lost, while they had been poor in the remaining portions of these districts. Considerable stocks, however, were believed to be in existence, especially in Kaladgi and Dharwar. On all the relief-works it was agreed that very little attempt was made to enforce the completion of a sufficient task and that a large proportion of the people employed were not driven there by fear of immediate want. The physical condition of the people was good. Private charity was being largely but not wisely distributed at Ahmednagar and Sholapur; in the latter place, except the lame, blind and very aged, Sir R. Temple did not see any one who would be a fit recipient of State charity outside the works. There were no emaciated adults or famine-stricken children: indeed, among 1,700 children to whom the daily dole was distributed, he did not see one who was not "comparatively plump and well clad." In his third minute,[4] Sir R. Temple reviewed and summed up the results of his observations:—

The three striking features in the scarcity of the Bombay Presidency are:—

(1.) The utter and entire failure of crop in the worst affected tracts, hardly admitting of even one anna yield out of sixteen annas (assumed food-crop) being expected.

(2.) The extraordinary activity of private trade, supplying fully with grain the markets in large districts which had suffered total loss of a whole year's harvest.

(3.) The comparative cheapness of prices in these districts, averaging from 20 to 24 lbs. the rupee for common food-grain.

The expenditure was estimated as likely to be about 1½ million sterling, or 150 lakhs of rupees, on the assumption that the number of persons on relief, which was then about 300,000, would rise to 950,000 in May, sinking again rapidly in July and August. The following were the details of the calculation[5]:—

| | Rs. |
|---|---|
| January to March, 416,000 persons per month for 3 months at Rs. 3 per month | 37,44,000 |
| April to June, 705,000 persons for 3 months at Rs. 3 per month - - | 63,45,000 |
| July, 340,000 persons for 1 month at Rs. 3 per month - - | 10,20,000 |
| TOTAL - | 1,11,09,000 |
| Add for charitable relief at 10 per cent. on the relief expenditure - - | 11,00,000 |
| Estimate on account of extra establishments and contingencies at 12 per cent. on relief-works outlay, say - - - - - | 13,00,000 |
| Add estimated total of expenditure up to the end of December 1876 - | 14,00,000 |
| TOTAL - | 1,49,09,000 |
| Or - - | £1,490,000 |
| Or say 1½ millions sterling. | |

[1] B. B. II. p. 32.
[2] *Ib.* II., p. 22, January 9.
[3] B. B. II., January 12, p. 24.
[4] *Ib.* II., January 12, p. 27.
[5] *Ib.* p. 31.

But if the expenditure is to be kept within this limit, certain points seem to me to deserve special attention, namely,—

(1.) The exaction of task-work upon all the lesser works under the district officers, upon most of which works I fear that it is not at present exacted in the same manner as it is upon the works under engineering authorities. The present work is thought to be not hard enough.

(2.) The withholding of admission to the relief-works in the case of those persons who do not appear to be in a depressed condition. Most of the officers whom I consulted seem to think that a certain proportion of those now on the works are not in absolute want.

(3.) The concentration, until at least the 1st April, of relief labourers, under the Civil as well as under the Engineering authorities, upon works of those larger descriptions which admit of professional supervision.

(4.) Special caution in the admission to the relief-works of ryots and others whose names are registered as possessing tenures or under-tenures in land, as it is to be presumed that, for the present at least, such persons would either have some little store of grain or some means of raising money wherewith to buy food. I am informed that a certain, perhaps a considerable, number of these persons are already being employed on the works, and the necessity of this appears to me doubtful.

(5.) Great care in admitting to charitable relief from State funds those who may be unable to work. I saw at Sholapur some thousands in receipt of organised and most praiseworthy private charity, among whom were great numbers that were not in such extremity as to render them absolutely eligible for charitable relief at the public expense.

In a subsequent minute, January 24th, he expressed more strongly[1] his fears that, on [illegible] of the petty village-works, people could obtain, for the asking, and in return for [illegible]o no work at all, wages in money or grain; and he recommended that many of [illegible]petty works should be discontinued, at least for the present.

He further urged the importance of village inspection, and the necessity of strengthening [illegible]strict establishment and appointing special officers for this purpose; since—

[illegible]e labour-tests are rigid, then it is always possible that individuals who, from one cause or other, [illegible] unable to answer those tests, may drop into dangerous distress. If then there be no village inspection, such persons might perish, but if there be village inspection they cannot perish, for their condition will be discovered, and they will be immediately brought up before the nearest relief authority.

Again, if the relief labourers are to be concentrated much more than at present upon works of larger description, the engineering establishment, both superior and subordiuate, ought to be greatly and immediately strengthened. For instance, there are many small irrigation projects strongly recommended by the local authorities of the Deccan, upon the carrying out of which relief labour might be employed but which cannot be properly prosecuted for want of professional assistance.

He also strongly advocated the policy of suspending rather than of remitting the revenue; the Collectors expected that about 50 lakhs of rupees could not be realised during the year, but they agreed that if the next year gave a bumper crop, then much or most of this sum could be collected, and if two good years come in succession, all could be collected. "Four years ago in Poona, the Collector succeeded in collecting "all the land-revenue suspended in the preceding year."[2] To this subject, however, special reference will be made in a succeeding paragraph.

11. *Stricter management of relief-works.* The views thus expressed by Sir R. Temple as to the management of relief-works were entirely in accord with the views of the Government of Bombay, and with the plans they had formed for instituting large works under professional supervision. In some degree they had been thwarted by the unwillingness of the Government of India to sanction such large undertakings until fully satisfied that a famine was really impending and that measures on a great scale must be taken for the relief of the famine-stricken, and to this delay and the necessity they were under of opening a large number of small local works, they attributed the amount of disorganization which Sir R. Temple pointed out. The orders of the Bombay Government, issued 13th December 1876,[3] had clearly laid down that it was not "the desire or "intention of Government to render relief-works attractive," and it was feared even then that the large and increasing numbers of labourers indicated that they had been "rendered "too attractive, either by the rate of wages earned upon them, or because for want of "efficient superintendence or from other causes, a proper amount of labour had not been "exacted from the persons who resort to them." Accordingly the wages of labourers were fixed as follows:—

For an adult male, one anna, plus the value of one pound of grain.
For an adult female, half an anna, plus the value of one pound of grain.
Working boy or girl, half an anna, plus the value of one pound of grain.

The Government had also called for estimates of the additional establishment required by each district. Again,[4] referring to a remark by the Collector of Poona that small

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[1] B. B. III., p. 26.
[2] *Ib.* p. 26.
[3] *Ib.* IV., p. 1
[4] *Ib.* III., p. 32.

works in each village "would be more popular, because they would not take the people "away from their homes," the Government observed that "at the present time there is "nothing which more obviously requires to be checked than the popularity of the "relief-works." "They did not, nor do they now, attach importance to the works on "which able-bodied persons were to be employed, being close to their homes; but, on "the contrary, regard this proximity as being a temptation to people who are not greatly "in want to seek relief under circumstances where it may be found without much "trouble or inconvenience to themselves."[1] They had already and independently arrived at the conclusion embodied in Sir R. Temple's suggestion that the relief-wage mentioned above, being found sufficient for labourers doing a fair tale of work, must be too high for those who did little work, and decided on the 19th January that on Civil agency works, on which for want of professional supervision it was impossible to exact a full task, the wage should be reduced by half an anna in the case of men, and a quarter of an anna in the case of women and children. This was the first introduction of the "reduced wage," on the effects of which both here and in Madras so great a controversy subsequently arose.

12. *The strike of the labourers.* The immediate result of this was to very considerably reduce the numbers on the Civil Agency works. They fell from a daily average of 125,971 in January to 59,652 in February; while at the same time, though new large works were opened and efforts were made to induce the people to go to them, the numbers employed on them did not increase, but fell slightly from 191,000 to 183,000. The decrease on the Civil agency works was chiefly in Ahmednagar, Poona, and Sholapur, in which districts alone the numbers so employed had been large, and it was largest of all in Sholapur, where about 40,000 people went on strike sooner than submit to the severe discipline now introduced. A good deal of sympathy was elicited by this strike, under the impression that the laborers had been driven to take the step through harsh treatment, and that they would perish from want of relief; but the Bombay Government reported that only one death from starvation had occurred there, and that it would be very mischievous to yield to what evidently was the result of combination. The reduction, however, was watched with some anxiety, lest through any misunderstanding persons really in want should leave the relief-works and starve; and the Commissioner of the Southern Division issued the following orders to his Collector:—

| — | December. | January. | February. | March. |
|---|---|---|---|---|
| Ahmednagar | 12,058 | 8,276 | 2,735 | — |
| Sholapur - | 58,809 | 56,659 | 10,078 | 5,986 |
| Poona - | 16,752 | 29,569 | 18,752 | 6,620 |

When men leave the works, being disgusted, the overseer in charge of the works must *at once* send to the Assistant Commissioner in charge of the taluka the names of the people and their villages. The names will be sent to the respective village officers who should watch these persons and weekly report on their physical condition, taking care that no person is allowed through obstinacy to die of starvation. Of this the village officers will be held personally responsible. When these persons are really pressed by want they will, in all probability, repent and return to the works.

These orders were approved by the Bombay Government, who added the following remark[2]:—

It is quite impossible to fix any standard of physical capability applicable to all cases. A person who is apparently in good health and condition, who is not old, infirm, or affected with any physical defect, must be held to be capable, due allowance being made for a time for want of experience in the work assigned to him. In detail, the matter must be left to the judgment and intelligence of the local officers. The effect of the orders reducing wages and exacting more work should, of course, be closely watched. It is the object of Government, while opening relief-works to all who are really in need of assistance or are suffering, at the same time to take such precautions as are practicable to prevent any abuse of the charitable arrangement thus made.

13. *Discussion as to saving life at any cost.*—But on reading the instructions issued to Sir R. Temple, the Bombay Government conceived that they were opposed to the above order that no one was to be allowed to die of starvation through obstinacy, and a resolution issued on January 25th[3] laid down that—

In the event of an individual refusing to perform work which he is capable of doing on the terms fixed by Government, no relief shall be afforded to him at the public expense during the continuance of such refusal.

The Government of India in reply explained[4] more fully what had been meant by those instructions. They denied the reality of the dilemma, which was commonly

[1] B. B. III, p. 12. [2] Resol. Jan. 18. [3] B. B. III, p. 30. [4] *Ib.*, p. 54.

supposed to exist, between allowing people to die of starvation and incurring expenditure which might bring ruin upon the country. "We say that human life shall be saved at "any cost and effort;" and if it is asked what "the general principles are by which the "district officers should be guided in refusing the aid needed to preserve life, the reply "must be that there are no such principles, and that there are no circumstances in which "such aid can be refused." But the order of the Government of Bombay, that no one should be allowed to die of starvation through obstinacy, "was approved, because the "Governor General in Council does not believe that any one ever died of starvation through "obstinacy, and no rules for dealing with such cases can be necessary." The Bombay Government rejoined[1] by expressing a fear that as a matter of fact people did die sometimes of starvation through obstinacy. The immediate effect of the reduction of the wage, the exaction of moderate tasks, and the transfer of able-bodied persons from the civil to the professional relief-works, had been that—

large numbers of people have left the works, declining to submit to the reduction of wages, or to perform the required tasks, or to accept the work tendered. There are other influences at work to sustain them in this movement, and the people are, many of them, voluntarily suffering great privations.

Some of those who are on strike are comparatively strong and robust, and able for a time to endure privation, but others are weakly; they appear to be acting in bodies and in concert, and the fear is that before the majority, who are comparatively strong, are brought to reason, some of the weakly will be reduced to a condition of great prostration. They wander about and may die out of reach of assistance. The Government therefore is placed in this dilemma—if they give way to the people, they cannot successfully carry out the policy of the Government of India, in which they concur, of strictly limiting expenditure, and if they do not give way, some deaths may occur. Feeling, therefore, that their rule has been approved by the Government of India, under what they cannot but hold to be too sanguine a view of the case, they will, until otherwise instructed, act upon the positive injunction contained in your 4th paragraph, that "no one shall die of starvation if it be in the power of Government to prevent it."

With regard to the men on strike in Sholapur, the Government of India entirely agreed[2] with the Government of Bombay as to the mischief of yielding to a strike which was attributed to combination. The result was that the numbers on relief-works in Sholapur rose again in April and May, but never reached the height they had attained in January. The following account gives the opinion formed at the time by Sir R. Temple as to the motives and the results of this strike[3]:

The number who discharged themselves from Government relief in the manner above described were about 102,000;[4] they did, indeed, at first show signs of some method and system in their proceedings. They liked the village works with a lax system from which they had been discharged. They disliked the public works with a strict system, to which it was proposed to transfer them. They imagined that by throwing themselves suddenly out of employ they virtually offered a passive resistance to the orders of Government. Many of them endured more or less of inconvenience and privation in furtherance of a plan whereby they hoped ultimately to regain their position on the easy-going village works. For so favourable an object they deemed that some suffering might be borne. They counted somewhat on exciting the compassion of the authorities and still more on arousing fears lest some accidents to human life should occur. They wandered about in bands and crowds seeking for sympathy. They probably did meet with sympathy, indirectly at least, in various quarters. They certainly had leaders both from among their own body and from among the employés whose vacation had ceased from the contraction or cessation of the village works. Moreover, the village headmen (patels) are, as a class, much opposed to any system of relief-works which takes the people away from their homes. This feeling may be natural on their part, but it cannot receive attention when it militates against so important a principle as the application of a definite test to a relief system in time of famine.

The Local Government, however, did not yield, though it did report the matter to the Government of India, apparently with a view to strengthening the position by eliciting further authoritative declarations. The Government of India on two occasions declared in effect that undue concessions must not be made to combinations of work-people formed with sinister or self-interested objects, and that, although Government was bound to do its utmost to save people from death by starvation, it could not always undertake to save them from death owing to their own obstinacy or misconduct. These views have doubtless helped to guide the thoughts of the people, and to subside any unreasonable hopes which may have been engendered.

Of those who thus deserted the relief-works some returned to labour when they found resistance unavailing.[5] But many, after wandering about for a short time, settled quietly in their own villages, where they still are (as I have myself seen them in several places) in a condition which, if not good, is yet not reduced. Of these it is thought many must ere long be constrained to apply for relief.

14. *Sir R. Temple's second visit in March.*—In the latter half of March Sir R. Temple again visited the famine districts of Bombay, on his return from Madras. In Sholapur[5] the numbers on relief-works were lower by 45,000 than they had been in January, but the civil officers believed that the condition of the people in the villages was fairly good,

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[1] B. B. III, p. 90. [2] *Ib.*, p. 91. [3] B. B. II, pp. 303–4.
[4] *i.e.*, difference between 136,000 on the 12th January and 34,000 on 12th March as above stated.
[5] B. B. III. p. 295.

and those on the works were certainly in a fair state of bodily health. Village inspection had been well organised: each taluka was divided into eight or ten circles with a relief inspector over each: a register of paupers was prepared in every village: and the infirm and bed-ridden were fed there in their homes, while others had to reside in the relief-house at the headquarters of the taluka. One Assistant Collector was in charge of each taluka. In Kaladgi[1] things were not so well managed: the number on relief-works was very small, and had decreased by a half since February, the decrease being due to a strict adherence to the practice of shifting the labourers from one work to another, and employing them only at a distance from their homes. It was believed that the people who had left the work were supporting themselves in one way or another at their homes, and that no one was dying of hunger in their villages; but no organised system of village inspection existed corresponding to that in Sholapur. Among the labourers on relief-works and the inhabitants of some villages he visited Sir R. Temple found several emaciated persons. In Ahmednagar village-relief under Circle Inspectors was carried on in the worst talukas, and no starvation deaths had been reported, but the wages on Civil agency works were as low as 1 anna 1 pie for an adult male, and on the Dhond-Manmar line some very poor-looking gangs were found. In Poona large and concentrated relief-works were being successfully carried on, and it was said that those who had left the works in January and February had either emigrated to the Nizam's country or the Western Ghâts with cattle, or had gone to Bombay for work; and that very few of the ordinary residents now remained in the villages of the two worst talukas. The labourers on relief-works for the most part seemed in good case, especially those on the Mutha Canal where relief was earliest begun. No regular relief-houses had been established for the distribution of cooked food; village lists of paupers had been drawn up, in accordance with which the patels gave to each person on the list an order on the village grain-dealer to deal him out a pound of grain a day, with an addition of one pice in cash per week. The district officers considered that this system worked well, and that no person had starved or were likely to starve in the villages. Taking a review of the whole Presidency, Sir R. Temple[2] expressed himself well satisfied with the administration of famine relief, and the only point in which he noticed any shortcoming was in respect of charitable relief and inspection of the villages. There were at that time about 42,000 persons in receipt of this form of relief, and he would have wished to see the number larger, though at the same time the reluctance of many of the destitute poor to resort to the poorhouse was due to a feeling of self-respect which was creditable to them.

15. *Subsequent history of the famine in* 1877.—The period of severe distress began about the end of March, by which time local stores had been to a great extent consumed, and the harvest operations were entirely over; but at the end of April[3] the number on relief was only 3·5 per cent. of the distressed population, instead of 20 per cent., as had been anticipated; and it was clear that—

considering the extent and intensity of the crop failure, and the generally miserable condition of the country throughout the famine tract, the self-sustaining power of the people had been underrated, the private means of individuals under-calculated, and the willingness and ability of the richer persons to relieve and employ their poorer neighbours, had not been sufficiently appreciated.

The distress went on increasing in severity till the middle of June[4] when the number on relief reached its maximum, 7·1 per cent. on the affected population. When the monsoon set in the number of laborers fell rapidly; but though the rains began favorably in June, they failed almost entirely in July and August, and a second period of distress and apprehension began till the heavy downfall of September relieved all minds from their worst anxieties. It was during this period that prices stood highest, reaching the limit of 8½ pounds[5] for a rupee in the Belgaum and Dharwar districts in August, and in Kaladgi in September, but about the middle of September they again began to fall.

In August the numbers on the hands of Government began to rise again, but, though the increase at this time under the head of gratuitous relief was large, they never reached the height attained in June. From the beginning of September, though the helpless poor did not diminish, the reduction in the number of laborers continued to bring the total number down, and after the middle of that month the reduction became general under all heads. The last laborers were discharged at the end of November and the relief-houses are being gradually, but rapidly, closed.

16. *Prolongation of distress in* 1878 *and* 1879. The closing minute by Sir R. Temple was written on the 24th December, 1877, in the belief that the famine was then at an

[1] B. B. III., p. 297. [2] *Ib.* p. 303. [3] K. II., para. 41.
[4] M., para. 30. [5] M., paras. 4 and 30.

end. There was however a revival of[1] distress in the spring of 1878, owing to the prevalence of high prices and to the poverty of the spring crop which suffered from the absence of the winter rains. This was still farther enhanced by the holding off of the summer rains in June and July, which caused considerable anxiety till they set in abundantly in August. The districts which suffered most were Kaladgi, Poona, Ahmednagar, and Nasik. Relief-works were started in March and suspended in September, they cost Rs. 288,455, and the value of the work done was 89 per cent. of the outlay. The highest number employed on one day, 13th July, was 19,544. Gratuitous relief was given at central poorhouses, the expenditure on which was Rs. 27,324, and the largest daily number relieved in this way was in the week ending 24th August, when 2,331 persons were fed. The misfortunes of this Presidency were not yet at an end. The autumn crop of 1878 and the spring crop of 1879 were both below average, especially in Guzerat and Katiawar, and a great portion of what was then produced was destroyed by an extraordinary plague of rats which infested the southern Deccan and South Mahratta districts: rewards were given for their extermination and over 12 millions have been destroyed. In April 1878 relief operations had again to be started and village inspection set on foot in the worst talukas. Two railways, the one to Kaladgi and the branch to Bhaunagar in Katiawar were begun, the latter employing as many as 18,000 labourers daily; in August the number of persons on all the relief-works in the first week of that month was 41,092. In the first week of September the number on gratuitous relief was 17,656. In the half-year ending on the 30th September, 1879, the outlay on relief-work was Rs. 609,000 and on gratuitous relief Rs. 130,000; the estimated expenditure under these two heads for the whole year ending 31st March, 1880, was Rs. 900,000 and Rs. 200,000 respectively.

17. *Principles of relief-works.* The principles which the Bombay Government laid down from the first for the guidance of its officers, and which the Supreme Government after a little hesitation accepted, have already been explained and are briefly summed up thus[2]—

I.—That as far as possible large, concentrated, and useful works should be undertaken.

II.—That checks and tests should be applied which would deter persons from seeking relief who were not in real need, and which would, as far as possible, prevent the abuse of public charity.

The classes of relief-works were two; those under Public Works officers and those under Civil agency.

*T., paras. 23 and 24.*—The works under Civil agency were of a petty description, consisting in some districts of cross-roads leading from one village to another, and in other districts of the excavation of village tanks. Though far from valueless, these little works would not claim any high degree of public value.

The works under the Public Works Department mainly consisted of projects of irrigation and of trunk roads. There were some people employed on our railway, the chord line from Dhond to Manmar: the numbers were at one time considerable, amounting to 30,000 daily.

The admission to these two kinds of works depended on the capability of the laborers, who were classified thus:—

*K. II., para. 20.—Class 1st.*—The able-bodied men and women, who should as a rule be drafted to the works, where there are any such within reach, under the Public Works Department, where the supervision is of a stricter and more effectual character, and where the value and quality of the work performed can be more correctly regulated and estimated.

*Class 2nd.*—The less capable, the older men, and the women and children, who may in larger proportions be employed on the works under the Collectors, where the supervision, though it may be less strict, should still be maintained as far as is compatible with the object of the works. The work-people should not be permitted to idle, and the work done should be regularly measured up, and its value calculated with reference to the expenditure incurred.

This rule was, however, relaxed in the case of members of the same family, who might be of different classes of strength. It was ordered therefore that, when able-bodied persons were employed on works, their families and immediate dependents, though not themselves able-bodied, should also be received, and these were generally put together in a separate gang on the work.

The effect of this classification of laborers and of the general adoption of the first of the two principles quoted above will be seen at once by a reference to the respective numbers employed on the two kinds of work, as given below in para. 21. While in December the numbers were nearly equal, and in January the Civil agency works were

[1] This para. is based on a minute by Col. Merriman of 1st November, 1879, received after the rest of the history had been written.

[2] K. II, para. 12.

not much behind the others, in May they had fallen so much that they employed only a tenth of the total number of laborers, and they continued in this proportion till September. By far the greatest part of the relief administered in Bombay, when the system was well established, was administered on these large relief-works.[1]

18. *Tests : A low scale of wages.*—The "checks and tests" applied was mainly three : a low scale of wages, task-work, and the distance-test. The scale of wages finally adopted has been already stated. It was—

| | Adult male. | Adult female. | Working Children. |
|---|---|---|---|
| Public Works Department Works | Value of 1 lb. of grain, plus 1 anna. | Value of 1 lb. of grain, plus ½ anna. | Value of ½ lb. of grain, plus ¼ anna. |
| Civil Agency Works | " " " ½ | " " " ¼ | " " " ¼ |

The grain was to be grain of medium quality of the cheapest variety : the price was to be the price at which the grain was purchaseable at the Taluka head-quarters ; fractions of a pound were to be given in the labourer's favour ; when work was stopped by rain the Civil agency scale of wage was to be given ; on Sundays no work was done and no wage paid, except when grain reached the price of nine pounds per rupee, in which case seven days' wages were to be paid in the week ; a day's pay was to be given to labourers transferred to a work over ten miles distant ; the non-working children of labourers were to receive ¼ anna a day ; all cases of special weakness or emaciation, and also nursing-mothers, were to be treated specially, receiving additional wage or food at the discretion of the relief officer till such time as they had regained strength and could be classed with ordinary labourers. Wages were to be paid weekly or bi-weekly to ordinary labourers ; in some cases daily payments might be necessary, but not as regards the mass of the labourers.[2] With respect to the working of these rules, it is universally agreed that the wage on the Public Works Department works was sufficient and the people throve on it ; and there is an almost general consent that the Civil agency wage was also sufficient. Sir R. Temple says on this point (paragraph 49)—[3]

> Opinion was at first less confident in respect to Civil agency gangs ; but, as experience was gained, these people also were found to continue in ordinary condition. These observations were further confirmed by the sanitary officers after inspection, and also by the Sanitary Commissioner. Later in the season it was thought desirable to collate all the evidence, including the most recent experience, on the subject. And it is now regarded in the Bombay Presidency by all concerned as an established fact that the scale is sufficient and ought not in justice to the public interests to be exceeded.

That a rate of wage so much lower than has ever been systematically given before in famine time should have been successful is probably due to the palliatives that accompanied it—the payment for infants, and the special treatment for the enfeebled. Of these Sir M. Kennedy prominently mentions[4] the former as a most beneficial system. Sir R. Temple also draws attention to a third[5] important requisite : "there is always "one practical question to be considered,—whether the people receive the wages allowed "to them : " and on the whole he claims that it is shown that no such abuses existed, on any considerable scale, as must always spring up where supervision is lax and organization imperfect.

19. *Task-work.*—The rules laid down on the subject of task-work were that on Public Works Department works the task should be fixed[6]—

> at not less than 75 per cent., and on works under Civil agency at not less than 50 per cent. of the task that would be required from a labourer on full wages in ordinary times. And these words "the task that would be required from a labourer on full wages in ordinary times," it was subsequently explained (Government Resolution Nos. 156—546 E., dated 10th March 1877), meant the task that the particular labourer, looking at his strength, condition, and skill, would be able to perform if he worked to the full extent of his ability.
>
> Thus the orders were that labourers should be tasked not according to a fixed common standard, but according to the individual capacity of each, and that the tasks exacted should not be in proportion to the full capacity, but less by 25 or 50 per cent., according as the labourer was on a work under the Public Works Department, or on a work under Civil agency.

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[1] Extracts froman account of the system adopted on the Gokak Canal, by Mr. Palliser the Executive Engineer in charge, will be found in the appendix : they contain some useful and interesting details.

[2] Fortnightly payments, however, were common, advances being given after three or four days to new arrivals. On the railway, people often had to borrow from a bania and repay the loan with interest when pay day came. In Kaladgi payments were at one time three weeks in arrears, the numbers on the works having increased suddenly and overwhelmed the establishment. See evidence of Messrs. Keyser, Candy, and Spry, and Reverend Mr. Harding, before Famine Commission.

[3] See also summing up of evidence in my separate note on the "reduced wage."

[4] K. II, para. 29.

[5] T. para. 50.—Dr. Hewlett, the Sanitary Commissioner, also postulates that the wage on the Civil agency works should be paid daily ; but it appears that this was not generally done. (See Sanitary Report, 1877, p. 252.)

[6] M. paras. 19 and 20.

An able-bodied labourer who did less than his appointed task might be paid only the proportionate value of the task he had done, however small that was, but non-able labourers might not be paid less than the Civil agency rates.[1] The effect of the strict enforcement of the task was at first to entail a considerable amount of fining. Thus Mr. Bernard wrote :[2]

"On all the great works which Sir R. Temple visited in the Poona District, most of the labourers had forfeited from a fourth to a sixth of their wages during the earlier weeks that task-work was imposed. But now all the gangs, with but very few exceptions, do their full task and get their full wage" (which was then 1 anna 10 pie). On the Dhond and Manmar Railway, "during the first ten days no deduction was made for short work: then deductions began and the men for about ten days earned a little more than half the full wage : during the last week they have been doing three-quarters of full work." On the Mutha Canal the wages were 1 anna 9 pie. "During February the deductions on account of short work came to 9 per cent. on the total wages : but in March 90 per cent. of the gangs have earned full wages."

20. *Piece-work.*—At the first opening of the relief-works some inclination was shewn towards payment by piece-work, and it was ordered that task-work should be introduced in such a way as "to enable the labourer to earn his daily rate of pay or more than that "rate should he prefer to do so."[3] But on further consideration this project was abandoned. In June 1877 the Government wrote as follows[4] :—

Piece-work at ordinary rates has been disallowed in Bombay on the principle that although the Government have determined to sustain the people in a manner that will secure, as far as possible, a commensurate return for the outlay incurred, and that will not demoralise the recipients of relief, yet they do not propose to expend a larger sum of the public money than is absolutely needed to secure the essential object aimed at; and they hold that if the extent of relief necessary to secure the substantial safety of the people be afforded any excess of the outlay needed for that purpose is not justifiable, even though it be ultimately represented by work which, though it may prove useful, would not have been undertaken in ordinary times and under normal conditions. If this view be correct as regards large and useful works undertaken for relief purposes, but carried out under strict discipline and by professional agency, it is, perhaps, especially so as regards the petty works usually performed in return for the lower rate of wages under Civil officers, and for the most part in and near villages.

21. *The distance-test.*—It was found, however, that a low rate of wages, combined with a moderate task, was not by itself a sufficient test; people would seek employment on almost any wage, provided the works were not far distant and they could return to their homes at night.[5] The only check which, when combined with the above two tests, could be trusted effectually to keep off people who were not really in need of relief was that they should take some trouble in seeking for it. The Collector of Ahmednagar first suggested this step, by giving orders that when villagers who were believed to be well-to-do were at work close to their homes they should be sent to some more distant work. The Bombay Government adopted this plan and made it a general rule: on the Dhond and Manmar Railway it was particularly enjoined that persons who lived so near the line that they could return home at night should not be employed in that part of the work, but be sent to some other parts, at least 10 miles off their homes.[6] It was, however, added that the principles should be applied not rigidly but with discretion; and that "it might be relaxed in all cases where there was good and clear reason for relaxa-"tion." Sir R. Temple says of this test[7]—

If people are not severely distressed they will not comply: the fact of their complying is the best proof of their being so distressed. But it has this unavoidable disadvantage, that it cannot be applied all the year round. From November to June (in the Bombay Presidency) there is no chance of any useful rain coming: the season is open, the sky clear, the ground dry and salubrious. For these seven months the people can be marched about as the authorities deem fit; and their employment on good public works is comparatively easy. But from June to November these conditions are reversed; although drought may be prevailing, yet rain may come at any moment, causing agriculture to revive and demanding the presence of the people in the fields: the skies are fitful, the ground too damp for encamping, consequently the people cannot be kept at a distance from their homes, and their employment on good public works is extremely difficult. If then distress breaks out at any time between June and November, or even in May, just before the rains are expected, the due control of relief labourers becomes difficult or impossible. The authorities are obliged to temporize with these poor people and to suffer them to work near at home till the open season arrives, when a better organization can be employed. Until then an inferior control has unavoidably to be tolerated. This was the case in the Kaladgi district, especially when there was a serious augmentation of distress in July and August, and also in parts of the Belgaum district.

22. *Nature and value of the relief-works.*—The large works carried out were either canals, tanks, or roads. The most important of the former class were the Mutha, Nira, and Gokak canals: the Mutha runs past Poona, supplying water to the town and cantonment, as well as to the rich garden cultivation round the town and to a long strip

[1] M., para. 21. [2] B. B. III., p. 300, 24th March.
[3] M., para. 19. [4] F. B., p. 857.
[5] K. II, para. 23. [6] M., paras. 23, 24. [7] T., para. 42.

of land to the east of it; the Nira is constructed to water the drought-stricken taluka of Indapur; and Gokak is in the Belgaum District. It was fortunate for the Presidency that the former Chief Engineer, Colonel Fife, had given so much attention to works of irrigation, and that the plans and estimates of many such projects, prepared under his orders, were ready for immediate adoption, especially in the Districts of Poona, Sholapur, and Satara. The roads, though some were important, were a less useful class of work, and several of them were left unfinished when the famine closed. They were mostly designed to connect the eastern and outlying portions of Kaladgi and the South Deccan with the Great Indian Peninsula Railway, and with the passes which lead down the passes through the Western Ghâts to the Konkan: their total length was about 3,130 miles.[1] The following statement[2] gives some particulars as to the nature of the canals and tanks and the relief afforded by them :—

| District. | Name of canal or tank. | Highest number of relief labourers employed on it. | Approximate area of tank in acres. | Approximate area under command in acres. | Length of canal or main channels in miles. | Expenditure during the famine in rupees. |
|---|---|---|---|---|---|---|
| Khandesh | Mhaswa tank | 670 | 421 | 2,060 | 6 | 38,000 |
| Ahmednagar | Ojhar canal extension | 3,500 | — | 17,528 | 9 | 31,000 |
| Poona | Mutha canal | 18,155 | 3,681 | 105,812 | 70 | 2,51,000 |
| | Nira canal | 16,789 | — | 279,680 | 129 | 3,94,000 |
| | Matoba tank | 6,420 | 477 | 12,412 | 20 | 1,73,000 |
| | Shirsophal tank | 5,943 | 834 | 10,000 | 15 | 1,16,000 |
| | Bhadalwadi tank | 986 | 336 | 2,900 | 15 | 7,000 |
| Sholapur | Ashti tank | 17,179 | 2,677 | 13,324 | 29 | 3,22,000 |
| | Pangaon tank | 9,943 | 6,702 | 60,000 | 80 | 1,34,000 |
| Satara | Nehr tank | 16,836 | 675 | 12,800 | 17 | 2,92,000 |
| | Mhaswad tank | 15,651 | 4,014 | 90,000 | 31 | 4,06,000 |
| | Pingli tank | 10,374 | 349 | 4,100 | 11 | 2,76,000 |
| Belgaum | Gokak canal | 11,946 | — | 77,319 | 52 | 2,17,000 |
| | Gaddikeri tank | 1,231 | 136 | 450 | 2 | 18,000 |
| Dharwar | Dambal tank | 1,897 | 421 | 1,790 | 2 | 57,000 |
| | Medleri tank | 1,129 | 169 | 1,916 | 10 | 26,000 |
| | Hirekerur tank | 1,001 | 567 | 562 | 2 | 18,000 |
| | Rambennur tank | 908 | 268 | 174 | 2 | 24,000 |
| | | — | 21,727 | 692,827 | 502 | 28,00,000 |

The total area of all the tanks may be set down at 21,727 acres, the total length of the canals and main channels at about 502 miles, and the total extent of lands irrigable at about 692,827 acres. The works, however, are not complete, though they may be described as being in various stages of completion. Even in their present state, however, a few of them will afford some useful irrigation. The total expense incurred during the famine on these irrigation works may be set down at Rs. 28,00,000 or £280,000 ; and the expenditure required to complete them may be estimated at about Rs. 63,00,000 or £630,000.

In spite of the excellence of the organization and discipline on these works, it was necessarily to be expected that work done by relief labourers, most of whom are unskilled and many of whom are weakly, would be more expensive than that done by labourers in ordinary times. In no past famine, however, has the extra cost of labour been so little, or the toil of the labourers so well utilised. This will be apparent from the following statement drawn up by the Examiner of Public Works Accounts[3]—

| | Value of work done. | Extra cost charged to Famine. | Total. |
|---|---|---|---|
| | Rs. | Rs. | Rs. |
| Roads and miscellaneous | 51,99,000 | 18,34,000 | 70,33,000 |
| Irrigation-works | 20,65,000 | 13,64,000 | 34,29,000 |
| Dhond-Manmar Railway | 8,50,000 | 20,00,000 | 50,000 |
| Local works, extra cost only | — | 55,000 | — |
| Total | 81,14,000 | 34,53,000 | 1,15,67,000 |

[1] T., para. 26. [2] T., para 30.

[3] Colonel G. J. Melliss' evidence before Famine Commission.—These figures do not agree with those in Sir R. Temple's minute, as these show the expenditure up to 31st March 1878, while his figures run only up to December 1877. According to his minute (paragraph 36) the expenditure on irrigation works was 28 lakhs, on roads 55 lakhs, on petty works 10 lakhs, total 93 lakhs of rupees.

Of the total amount expended, 70 per cent. was met by the value received and only 30 per cent. was the additional cost of relief. The greater part of this amount has been classified thus, under the main heads of expenditure :—

| | Roads. Rs. | Irrigation. Rs. |
|---|---|---|
| Materials | 2,40,000 | 1,90,000 |
| Skilled labour | 1,75,000 | 1,25,000 |
| Unskilled labour | 56,80,000 | 19,25,000 |
| Supervision | 3,35,000 | 1,30,000 |

so that out of this sum of 87 lakhs, 76 lakhs, or 88 per cent., was expended on the support of the class of labourers for whom relief-works are specially intended.

23. *Numbers employed on relief-works.*—The total number of labourers employed on relief-works was as follows :—[1]

| | Public Works Department. | | | Civil Agency. | Total. | Infants. |
|---|---|---|---|---|---|---|
| | Roads. | Irrigation-works. | Total. | | | |
| 1. | 2. | 3. | 4. | 5. | 6. | 7. |
| November | 60,622 | 16,564 | 60,923 | 35,914 | 96,837 | — |
| December | 117,582 | 37,937 | 147,234 | 110,095 | 257,329 | — |
| January | 142,655 | 43,852 | 191,893 | 125,971 | 317,864 | 15,824 |
| February | 120,269 | 56,517 | 183,626 | 59,652 | 243,278 | 41,737 |
| March | 126,338 | 64,257 | 199,922 | 28,592 | 228,514 | 49,365 |
| April | 158,712 | 88,160 | 255,691 | 30,489 | 286,180 | 76,341 |
| May | 198,970 | 111,322 | 328,646 | 32,703 | 361,349 | 106,309 |
| June | 194,890 | 117,447 | 323,394 | 36,262 | 359,656 | 111,050 |
| July | 162,699 | 78,654 | 239,725 | 23,561 | 263,286 | 80,193 |
| August | 184,040 | 64,612 | 246,539 | 27,803 | 274,342 | 80,112 |
| September | 160,415 | 53,274 | 198,046 | 24,848 | 222,894 | 64,637 |
| October | 36,442 | 31,498 | 68,298 | 16,150 | 84,448 | 43,949 |
| November | 4,446 | 8,801 | 19,298 | 3,429 | 22,727 | 19,600 |
| Total | 1,668,080 | 772,895 | 2,463,235 | 555,469 | 3,018,704 | 689,117 |

Taking the period of relief as thirteen months, the average number employed daily throughout that time was 232,200: or adding in the non-working children, 285,000. The expenditure (according to Sir R. Temple's minute) was 93 lakhs of rupees or Rs. 3·1 per head per mensem, but this evidently includes materials, supervision, &c. The actual sum distributed in wages is nowhere stated.[2] Not many of these labourers were substantial proprietors, but there was a large number of the lesser ryots and of subordinate cultivators holding on metayer tenancies under the large ryots. On the Nira Canal about 70 per cent. were found to belong to this class: on the Mutha Canal, when a census was taken, 16,700 belonged to this class out of a total of 26,000: on the Civil agency works in Ahmednagar only about 3 per cent. were found to be cultivators by profession: the rest were members of the lower castes, Kolis, Bhils, Mhars, and village servants.[3]

24. *Charitable relief.*—Charitable relief was of three kinds: it consisted (1) of the payment of a pice a day to the infants of labourers on relief-works, (2) of relief to paupers in relief-houses, (3) of relief to paupers at their homes, travellers, wanderers, &c. The numbers of the first class, the infant children of labourers, have already been given in the preceding paragraph. The other two classes were in the early period of the famine mainly left to private charity, the collectors receiving a grant to enable them to disburse relief whenever they thought it necessary; but in this way only Rs. 70,000 had been spent by the middle of April.[4] On the 30th April definite instructions were issued as to the treatment of non-working paupers; they were originally drawn up by the Commissioner of the Southern Division on the model of those introduced by Sir J. Strachey in Moradabad, and were adopted by the Government with some slight modifications, and

[1] Columns 4 and 5 are taken from paragraph 22, and columns 2 and 3 from paragraph 27 of Sir R. Temple's minute. It is evident that column 4 is not the correct total of columns 2 and 3. There has probably been some confusion as to the classification of Public Works Department and Civil agency works.

[2] Except by Colonel Melliss, *ut supra*. But his figures apply to a longer period of 18 months.

[3] See evidence given before Famine Commission by Messrs. Keyser, Whiting, Clerke, and Hamilton.

[4] K. II., para. 37.

with the proviso that it was not intended to make them absolutely binding in every instance and in every district.[1] According to these rules, the Patels and Kulkarnis were to prepare lists for their villages, showing (*a*) those who were blind, infirm, and maimed so as to be unable to work, and orphan children; (*b*) pardanashin women and widows or deserted wives with small children; (*c*) those who, though unable to do out-of-door work, are still able to perform light labour at relief-houses. Of these the first two classes might receive relief at home and the third class, as well as all persons found wandering about in an emaciated state, were to be sent to the relief-houses, of which one was to be constructed at the head-quarters of every district and taluka, with branch ones in the taluka if necessary. At these relief-houses residence does not appear to have been enforced,[2] cooked food was given at them (1 lb. 2 oz. to a man, 12 oz. to a woman and 6 oz. to a child under ten) once a day and such work exacted as was practicable, *e.g.*, cotton-spinning, rope-making, corn-grinding, and all the service of the place. Each pardanashin woman was given a basket containing 14 oz. of cotton to spin with and money for a week's food at the relief-house rate; at the end of the seven days if she delivered up the spun thread, she received a fresh basket and another week's supply. Gratuitous relief was never administered at home to any save those who from sickness or infirmity were unable to move.[3]

25. *Village Inspection.*—This rule could only be effectually worked on the assumption that the villages were frequently and thoroughly visited, and all cases of distress hunted up. Early in November the village patels were warned of their duty to give immediate assistance to travellers in want, and to report all cases of distress in their village; a complete system of circle inspectors and taluk relief officers was organized in March, and in April the Government expressed its belief that the village system "is now worked so well by means of the chain of supervision that has been established, that no unusual occurrence could anywhere take place without Government being immediately informed of it."[4] There is no information on record as to the strength of the special establishment entertained for this purpose, but Sir Richard Temple stated[5] that it was nearly as strong as that employed in Bengal in the famine of 1874. The relief officers and other Government servants, and the headmen and other office bearers in the village, were enjoined[6] to search for and bring forward all persons who appeared to be in danger from want.

The force of language could not make these injunctions stronger than they were. The distressed districts were parcelled out into moderately-sized circles of inspection for the particular purpose. Over each circle was placed a special inspector. Much depended, of course, on the watchfulness of the village headmen, and accordingly they did much, partly of their own free will, and partly from the pressure put on them by relief inspectors. But, on the whole, they fell short of what was to be expected of them, and in respect of humane watchfulness in so grave a matter they did not fully justify the status assigned to them by the ryotwari settlement.

In justice, however, to the circle inspectors and to the village headmen, it must be said that the difficulty was immense of picking up all emaciated persons who were wandering about the country. This can be effectually done (as we positively know by experience) in well cultivated, densely-peopled tracts, where every village road, even every by-path, can be kept under the eye of authority. But this becomes almost impossible in a partially-cultivated, sparsely-peopled country like the Deckan, crossed in every direction by hills and jungles. The disposition of the people to wander about begging, the unwillingness of so many of them to resort to relief-works, or even to relief centres and camps where food can be got without work, their readiness to run the utmost risk from privation rather than submit to the simplest system of relief, can only be imagined by those who have seen these things.

With so many classes of this peculiar disposition, and with a country so unfavourably situated, there need not be any surprise if sometimes the best-directed efforts to prevent starvation in individual instances are frustrated.

26. *Numbers on Charitable Relief.*—The following statement shews the number of persons in receipt of gratuitous relief,[7] month by month. Unfortunately no distinction was made between the different classes of relief, nor is it possible now to shew separately those who were fed in the relief-houses and those who were relieved in their homes. It is evident, however, that the number of the latter class was comparatively small, and

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M., para. 27.

[2] It certainly was not enforced in Belgaum which was looked on as a model relief-house, and where the paupers wandered by day begging through the city (see Bombay Compilation, pp. 307–8; also pp. 397 403), and the rules are silent about it.

[3] T., para. 52.

[4] K. II., para. 39.

[5] Evidence before Famine Commission, Answer No. 177.

[6] T., paras. 53 and 54.

[7] T. 20.

that great distrust was felt of the soundness of this mode of treatment since "those who deserved relief got cheated by the patels, while others got relief who ought not."[1]

| | | | |
|---|---|---|---|
| November | 1,589 | June | 58,244 |
| December | 2,711 | July | 51,978 |
| January | 5,441 | August | 65,256 |
| February | 6,320 | September | 95,674 |
| March | 8,695 | October | 64,630 |
| April | 17,047 | November | 17,188 |
| May | 30,146 | | |
| | | Total | 424,934 |

The average number relieved daily for the whole period of thirteen months is 32,687. No very precise account is given of the cost of this relief, but Sir Richard Temple states in general terms that it amounted to ten lakhs of rupees. If so, it came to about Rs. 2·6 per head per mensem.

27. *Private Charity.*—Private charity was very active in the early part of the famine and continued in a fairly adequate manner to the last. In Poona and Sholapur the benevolence of rich native gentlemen was conspicuous, and there was hardly a town, great or small, which failed to receive marked benefit from native benevolence in the relief of distress.[2] In Bombay, when the influx of distressed wanderers began there, subscriptions were raised and a Committee appointed,[3] who "shewed remarkable efficiency in relieving this casual and extraneous indigence." On the other hand, Mr. Gibbs felt bound to protest against the mischevous manner in which much of this charity had been lavished.[4]

I feel sure that the experience of the past year has shewn that the effect of the large private charity, as distributed in this presidency, has contributed more than any other cause to demoralise the people.

It is a well-known fact that the princely grants made by Sindhia and other Native Chiefs were distributed almost solely to idle Brahmins and professional beggars, and that the poor starving laborers and artisans got no benefit therefrom. I also know the fact that where private charity was distributed in Poona, it was found that the same persons obtained gifts from two or three houses in the same day. And even where, as at Sholapur, the funds were ably managed under the direction of Mr. Morarji Goculdas, it was found that the able-bodied and those who could easily work for their living formed the larger body of recipients.

So grave an evil did miscellaneous charity seem to me, that I was seriously considering, in the event of the famine continuing for another year, whether some interference on the part of Government would not have become absolutely necessary.

28. *Importation of grain.*—The question was carefully discussed at the beginning of the famine, whether it would be necessary and right for the Government to interfere in the matter of importing grain into the distressed districts, and the conclusion was arrived at that no such intervention was requisite.[5]

In weighing the matter, the Government considered that any decided movement on their part would be likely to act prejudicially on the trade; that if the merchants were led to expect that they would be subjected to the competition of the Government, they would withdraw; and as it was clear that, no matter how powerful the Government might be, and that on however extended a scale their efforts might be made, they could not hope to effect all that the trade, if it exerted itself could do, it was held that it would be better for Government not to enter into the market at all; for though the Government might be able to do more than many merchants could do, they could not hope to effect so much as could be done by all of them. It was, therefore, publicly made known that Government would not in any way interfere with the grain-trade, or with the movements of grain, unless actually forced to do so by failure of supply, or by excessive extortion on the part of dealers; that they would buy nothing on their own account for importation into the affected districts, though they were ready to enter into contracts for the delivery on their own works of food supplies to their own labourers; that, in fact they were not prepared to do more than to act through the trade on behalf of those who came upon their relief-works, and that they would not in any way, themselves, assume the position of traders and importers, so long as they could ensure the people on the works being supplied with food.

From this decision the Bombay Government never departed, and it was, in their opinion, entirely justified by the event.[6] "From the beginning to the end of the "scarcity, the activity of private trade in grain was extraordinary." The railway imported 267,863 tons into the distressed districts and 166,137 tons were carried by sea (mostly by small country craft), to the ports of the Konkan, and then by bullock-carts up the ghâts to the Southern Deckan. "Still larger imports would no doubt

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[1] Evidence of Mr. Spry. See also that of Mr. Moore, Collector of Satara, to the same effect.
[2] T., para. 55. [3] T., para. 56. [4] G., paras. 23, 24, and 25.
[5] K. I., para. 11. [6] T., para. 10.

" have reached the famine districts if the railway could have carried more,"[1] but their stock of engines and wagons was too small for the traffic. When the distress in July and August in Madras and the Nizam's Territory entailed a still further strain on the carrying power of the railway, it was found necessary to direct that a preference should be given to food-grains booked for the distressed districts, the transport of other grains being postponed till all these had been disposed of. The order was withdrawn in October. It caused considerable inconvenience to the trade of Bombay, upwards of 200,000 tons of grain and oil-seeds being, it was calculated, held back temporarily from exportation.[2]

These circumstances were greatly deplored, but could not possibly be averted, by reason of the supreme law which regards the safety of a vast population, in danger of starvation, as paramount over all other considera ions.

It is possible, however, that arrangements may be devised for the future by which a stock of engines and wagons may be kept in the country sufficient to meet any strain of the kind.

29. *General efficiency of private trade.*—This was the only point in which Government attempted to interfere in any way with railway traffic. The suggestion that the rates of freight should be reduced so as to encourage importers, was pressed upon it, but was rejected as undesirable. As to inland carriage from the railway stations to distant marts,[3] it was ascertained—

From enquiries made from the grain merchants, that any interference by Government with the transport arrangements, or indeed any direct attempts to aid the merchants in obtaining carriage, would only have the effect of increasing the price of cart-hire, and the Government were requested to let matters take their own course.

30. *Supplies of forage.*—For fear, however, lest the supplies of forage should fail along the roads travelled by these carts, steps were taken for cutting and pressing grass in the hill-tracts on the Western Ghâts, and storing it at suitable places, in the Sholapur, Kaladgi and Dharwar districts. About 2,000 tons of fodder were thus prepared and stored, chiefly under the supervision of the Conservator of Forests, at a cost of Rs. 57,742: the provision, however, turned out to be unnecessary, and there was hardly any demand for the fodder, the realization by its sale amounting only to Rs. 10,704.[4]

31. *Instances of interference with private trade.*—The only other case in which Government took any steps which were of the nature of interference with private trade was in Kaladgi.[5]

From the remoteness of this district, and the fact that it contains few Marwaris and Bunias, the grain-stocks being chiefly held and sold by the Patels and Kulkarnis of the villages, and by the more wealthy ryots, who manifested great reluctance to sell on any terms, it became necessary for Government to take exceptional steps. This was done by sending grain gradually, but not in large quantities, from Belgaum and also from Sholapur.

The quantity thus imported was only 3,000 maunds or a little more than 100 tons, and it cost Government Rs. 23,000 or about 11 lbs. per rupee: the net loss was Rs. 2,600. "No doubt the traders could have thrown in the grain at a less cost[6];" but still the result of the step was beneficial, inducing the holders of grain to open their stores, and proving to traders that import, even to a tract so distant and so difficult of access, was possible and might be profitable. In some other cases[7] similar ventures were undertaken, on a small scale, by local and municipal committees, who imported a small quantity of grain when local stocks seemed to be low, and sold it at cost price to the poor of the town.

32. *Carriage of grain by human labour.*—In another direction the resources and versatility of trade were shown in a remarkable way.[8]

After the rains began, the use of cattle for the carriage of grain was supplemented by human labour. Large numbers of persons were engaged both in carrying head-loads and in dragging laden carts. This had the further important consequence of setting free for employment in agriculture many cattle which would otherwise have been necessarily engaged in bringing food for the people. As a measure of encouragement Government directed (Government Resolution No. 254 P., dated 23rd July 1877) that, where practicable, without breach of engagements with toll farmers and contractors, exemptions from tolls and ferry charges should be granted to persons carrying grain, either by head-loads, or in vehicles drawn by human labour. Special instructions were also issued for the protection of persons thus engaged.

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[1] K. I., 6. [2] T., para. 12
[3] K. I., 14. [4] M. para. 7. [5] K. I., 13.
[6] Evidence of Mr. Spry, late Collector of Kaladgi, and his reply in Bombay Compilation, p. 246.
[7] Such as Ahmednagar, Pandharpur and Satara. [8] M. 8.

33. *Prices.*—The following statement shows what the range of prices was in the distressed districts for the cheapest common food-grain (jowari or bajri), the average price of ordinary years being from 40 to 80 lbs. per rupee :—

| Months. | Khandesh. | Nasik. | Ahmednagar. | Poona. | Sholapur. | Satara. | Kaladgi. | Belgaum. | Dharwar. |
|---|---|---|---|---|---|---|---|---|---|
| November 1876 - | 24 | 31 | 23 | 22 | 15 | 19 | 16 | 15 | 13 |
| December „ - | 31 | 31 | 27 | 20 | 21 | 18 | 14 | 18 | 15 |
| January 1877 - | 32 | 32 | 30 | 23 | 20 | 20 | 17 | 20 | 18 |
| February „ - | 32 | 32 | 26 | 24 | 20 | 20 | 18 | 20 | 18 |
| March „ - | 34 | 32 | 25 | 24 | 21 | 20 | 17 | 17 | 17 |
| April „ - | 32 | 31 | 25 | 23 | 20 | 18 | 16 | 17 | 15 |
| May „ - | 29¼ | 27 | 24 | 20 | 19 | 17 | 19 | 15 | 14 |
| June „ - | 28 | 28 | 23 | 19 | 17 | 15 | 12 | 14 | 12 |
| July „ | 25 | 29 | 19 | 16 | 14 | 14 | 10 | 11 | 10 |
| August „ - | 19 | 18 | 14 | 13 | 11 | 12 | 10 | 9 | 9 |
| September „ - | 18 | 17 | 14 | 14 | 12 | 13 | 9 | 12 | 11 |
| October „ - | 23 | 20 | 20 | 19 | 22 | 22 | 12 | 16 | 13 |
| November „ - | 20 | 27 | 27 | 23 | 29 | 26 | 19 | 26 | 22 |
| December „ - | 31½ | 25 | 26¾ | 24¾ | 26 | 27¾ | 20 | 32½ | 33½ |
| January 1878 - | 29 | 26½ | 24½ | 21 | 16½ | 26¼ | 30½ | 30¾ | 27 |
| February „ - | 24½ | 22¾ | 22½ | 18¾ | 20½ | 22⅝ | 30¼ | 28 | No return received. |
| March „ - | 24 | 22⅕ | 18¼ | 18¾ | 20⅕ | 16⅓ | 25 | 24⅔ | Do. |
| April „ - | 24⅔ | 24⅓ | 20⅕ | 18¾ | 19 | 18⅛ | 24⅕ | 25 | 20 |
| May „ - | 26⅓ | 24⅔ | 20⅕ | 18¾ | 20¾ | 16⅔ | 18⅔ | 21 | 16⅛ |
| June „ - | 26½ | 22¾ | 18¼ | 18¾ | 16¾ | 16 | 16¼ | 18¼ | 16⅛ |
| July „ - | 27⅓ | 21 | 21¼ | 19¾ | 20¾ | 18½ | 16½ | 17⅓ | 15⅓ |
| August „ - | 33¾ | Not reported. | 24⅖ | 21⅗ | 21 | 19⅖ | 20 | 19⅘ | 17⅚ |
| September „ - | 29¾ | 20 | 23½ | 21¼ | 18¾ | 20½ | 27¼ | 23¾ | 21½ |
| October „ - | 30 | 21 | 22 | 23 | 18½ | 21 | 27½ | 25¼ | 22½ |
| November „ - | 35 | 26½ | 25¼ | 22 | 19 | 21½ | 26¼ | 25½ | 24½ |
| December „ - | 33½ | 28 | 24½ | 22½ | 19½ | 20½ | 32½ | 29 | 39 |

This indicates an extraordinary dearness of food, treble and quadruple the ordinary rates at some places for some time.[1]

34. *Emigration of agriculturists.*—Reference has already been made to the extent to which emigration was resorted to by the inhabitants of the affected districts. It took two forms : agriculturists who possessed cattle went off with them to the two directions in which they hoped to find pastures, the Western Ghâts and the hilly tracts in Hyderabad; others of a lower position emigrated to places where they hoped to find that employment was either more abundant or was given on easier terms. In order to facilitate the passage of cattle to the forests and pastures on the ghâts, the Government opened the forest reserves for grazing, and gave free passages for cattle by rail from Sholapur to Poona.[2] In the Eastern Districts the people were advised only to send the cattle most worth preserving, as the weakly ones would only consume the grazing, already too limited, which might otherwise preserve the more serviceable cattle; and in the Western Districts arrangements were made to pass on the herds of cattle as they arrived to wherever grass and water were most abundant. The mortality among the cattle was no doubt very great, but it was believed to have been mainly confined to the old and worthless cattle, of whom a large number are kept by the people; the plough bullocks suffered less, and, when the rain came, only a very small area was left unploughed for want of cattle. Throughout the famine draught-cattle worked in more than ordinary numbers.[3]

35. *Emigration of labouring classes.*—The other form of emigration, on the part of the labouring classes, was more objectionable, because it disturbed the relief organisation, and threw an unexpected strain on certain localities. A certain number of the Nizam's subjects came to the relief-works in British territory, but a larger number of persons emigrated from Ahmednagar and Sholapur into Hyderabad, and were assisted there by private charity, or received at the works and relief-houses. From the Native States in the Bombay Presidency, where the relief system was less efficient and complete, a considerable number of persons streamed into Kaladgi and Satara. On several occasions attempts were made to segregate these immigrants and deport them back to their own

[1] T. 8. [2] K. I. 32. [3] T. 76.

country; but they soon returned and escaped detection by passing themselves off as British subjects. The general opinion expressed by the Government of Bombay[1] was that it could never be worth while to keep an account of the cost of relief administered to foreign paupers and to charge it against the State from which they came; that circumstances might arise under which it might be right to deport them to their own State, but that ordinarily it is best to receive and treat them without distinction, and that, as a rule, "it is best not to interfere too much with a moderate flow of emigration "in any direction."

36. *Wandering.*—The worst form, however, which this readiness to emigrate from home assumed was a spirit of restless and aimless wandering, which caused immense trouble to the relief officers and great suffering and mortality among the people concerned. Mr. Gibbs writes[2]:—

It was found generally that persons in a state of great distress, often emaciated from want would come to the relief-house and after having received food and lodging, and, if ill, medical treatment and extra diet, on becoming restored to health and strength sufficient to perform work, would, on accepting batta to take them to the next relief-work, go away wandering over the country and return to the relief-house two or three weeks after they had left it, in as miserable a state as when they were first received. In some cases this was known to have happened three times.

Mr. Ashburner also writes to the same effect:—

It is quite incredible to those who have not seen it, how families with the almost certainty of starvation before them would repeatedly desert from the famine-camps in spite of all the remonstrances of the famine officers. It resembled the blind instinct of a wild animal to escape from confinement, rather than the act of an intelligent being. The labors of the famine officers were from this cause never-ending: no sooner had they by careful nursing and nourishing food, brought the famished people into a healthy state, than they would wander away, only to be brought back in a dying state after a few days.

If the famine officers had had the power to detain them till they had some assurance that they could support themselves, not only would the mortality have been much less, but we should have been able to exact some labor in return for the food they received.

37. *Legal power to use compulsion.*—Another cause of mortality was the refusal to accept relief when offered[3]—"The obstinacy with which persons almost in a dying state "would go anywhere rather than to a relief-camp. Numerous instances of this nature "were brought to the knowledge of Government," and in order to enable their officers to meet such cases efficiently without straining the law, it was proposed to give them legal powers of compulsion "to send such persons to a relief center, and, when restored suffi- "ciently to health to enable them to perform work, that they should be transferred to earn "their subsistence on relief-works and detained there." This was urged again even more strongly by the two Members of Council when the Sanitary Report revealed the extent of the mortality that had occurred. Mr. Gibbs wrote—

The mortality, whether it be great or little, was due to the ignorance of the people, to their obstinacy and their dislike for work. Had we had power to force the sick and starving to relief-camps, and those fit to work to relief-works, and prevent their wandering, we should, I feel assured, have had a much smaller amount of mortality to lament and a much smaller amount of demoralisation to overcome.

Mr. Ashburner wrote:—

As soon as it becomes quite evident that the people could not support themselves, Government should take power in an Act to move them into famine-camps, where they should be well fed and well worked on a thoroughly organised system. This would give us the command of such an enormous body of cheap but efficient labor that we should be able to carry out public works that would otherwise be impracticable, and famines would then be no longer a burden on the finances. There must be great mismanagement if a laborer and his family cannot earn enough food to keep them in health on useful public works, the designs for which have been carefully matured and considered beforehand.

The Secretary of State replied to this (7th November 1878):—

The legislative action suggested by some members of your Excellency's Council, for forcing the sick and starving to relief-camps, and for not allowing them to leave those camps without permission, could only be justified by extreme necessity, and its consideration may well be deferred until there is an immediate prospect of such necessity.

It does not appear, however, that the absence of this legal authority hampered officers to any material extent in doing what they felt to be the wisest and most humane thing for these paupers. When an influx of famine-stricken people into Poona and Bombay took place, closed relief-camps were started outside those towns to which all beggars and emaciated people in need of relief were conducted and compelled to remain there. They were fed and treated medically if necessary, and when they had sufficiently recovered, they

[1] Letter to Famine Commission, 15th October 1878. [2] G. 19. [3] G. 20.

were sent at the expense of Government to works or to their homes, according to their condition and circumstances.[1]

38. *Remission and suspension of revenue.*—The principle of the Bombay revenue system is that, ordinarily speaking, good years should pay for bad, and a moderate assessment based on the produce of average years should be paid in all years alike. But when there is a great and almost absolute failure of crops in any locality, it has been the custom to remit the revenue or a part of it absolutely: and accordingly when the extent of the famine first began to be realized, the Government proposed to remit from half to three-quarters of a million sterling. To this proceeding, Sir R. Temple, when he first visited the Presidency as Famine Delegate, strongly objected and pointed out the great importance of not sacrificing so large a sum if there was any possibility that it could be temporarily suspended and collected afterwards in more prosperous years. The system of suspension was unknown to the Bombay officers and its propriety was at first contested; but it was supported by the Government of India, and the Bombay Government agreed to try it, issuing instructions to warn its officers against too free remissions and authorizing them to hold balances in suspense in cases where it appeared likely that the ryot would, without undue pressure, be able to pay up in the next season.[2] The result of these orders is thus narrated in Sir R. Temple's minute. The entire revenue of the Presidency (excluding Sindh) is 262 lakhs of Rupees, and of the nine famine districts 140 lakhs of Rupees. Out of this only Rs. 2,16,000 were actually remitted, and Rs. 50,00,000 were suspended,—a sum which was ultimately reduced by the end of 1877 to 27 lakhs. If the season of 1877 had been favorable, all would have been got in; but as the rains were late and unequal, the balances had to be held over for a still longer period and the whole sum has not yet been collected.

39. *Native States.*—The statement in paragraph 7 showed in abstract form the population and area affected in the Native States which lie within the Bombay Presidency. The system of relief was the same as in the British Districts.[3] Revenue was remitted, employment was offered on works, and gratuitous help given to the non-workers. The wages on the relief-works were low,[4] and in many cases the Bombay Government scale was adopted. At the poor-houses cooked food was distributed,[5] and grain doles were made through the village officials to those who were house-ridden. The following statement shows the amount expended in relief:—

| State. | Revenue remitted. | Revenue suspended. | Per cent. of remissions and suspension on total Revenue. | Cost of relief-works. | Cost of gratuitous relief. | Highest daily Average. | |
|---|---|---|---|---|---|---|---|
| | | | | | | On relief-works. | On gratuitous relief. |
| | Rs. | Rs. | | Rs. | Rs. | | |
| Kolhapur - - - | 3,546 | 97,395 | 6·5 | 2,60,313 | 56,799 | 9,957 (May) | 5,176 (Sept.) |
| South Mahratta States (seven). | 30,655 | 6,17,387 | 50·6 | 4,50,019 | 52,677 | 8,196 | 2,711 |
| Sangli - - - | 1,48,631 | 2,80,699 | 87· | 21,803 | 22,786 | 8,641 (Dec. '76) | 1,866 (June) |
| Jath - - - | — | 78,534 | 83· | 49,186 | 12,393 | 5,010 (May '77) | 1,214 (Sept.) |
| Akalkote - - | — | 1,70,340 | 58· | — | — | — | — |
| Savanur - - | 1,495 | 277 | 33· | 5,212 | — | 300 | — |

Besides these two, other Satara Jaghirdars (Phaltan and Pant Prithinidi) expended about Rs. 12,000 on relief-works, and the highest number of persons relieved at any time in these States was 4,215. Again in 1878, the scantiness of the rains of 1877 having produced considerable distress in Guzerat and Katiawar, relief was afforded in most of the Native States in Katiawar. The Political Agent's report shows that in 39 States

[1] M 33. [2] B. B. IV, 18.

[3] The following facts are compiled from replies sent by the Political officers of these States, through the Bombay Government, to the Famine Commission.

[4] In Jath and Kolhapur the Government sliding scale was followed. Of the small South Mahratta States, three adopted the Government scale: the other four gave various rates of wages, about two annas on an average to a male laborer. In Sangli the wage was from 1½ to 2½ annas for a man.

[5] The amount is only stated in the case of Kolhapur, where an adult got one pound of jowari bread and some pulse soup.

Rs. 10,30,942 were expended on relief-works and Rs. 1,36,375 in charitable relief: but the numbers cannot be correctly stated. Relief was given altogether on the British pattern, and lasted mainly from February to July 1878. Probably something like 100,000 people were employed for some two or three months on the works, but no accurate statistics were kept, as after all this was only a brief scarcity.

40. *Proportion of population relieved to population affected by famine.*—The following table shows the highest number relieved at any one time in each of the distressed districts[1]:—

| | Population affected. | Highest number relieved. | | |
|---|---|---|---|---|
| | | Month. | Number. | p. c. to Population. |
| Khandesh - - | 646,944 | September - - | 24,595 | 3·8 |
| Nasik - - - | 250,000 | April - - | 25,997 | 10·3 |
| Ahmednagar - - | 677,376 | June - - | 59,129 | 8·8 |
| Poona - - - | 318,601 | August - - | 75,113 | 23·5 |
| Sholapur - - | 718,034 | June - - | 99,617 | 13·8 |
| Satara - - - | 461,000 | June - - | 70,188 | 15·2 |
| Kaladgi - - | 816,037 | September - - | 173,736 | 21·2 |
| Belgaum - - - | 501,000 | May - - - | 61,773 | 12·3 |
| Dharwar - - | 630,000 | June - - - | 82,091 | 13·0 |

The highest percentage is that of Poona, but here the population affected is perhaps understated, being too strictly confined to the eastern talukas, while in the centre and west of the district there was considerable distress. In Kaladgi the whole population of the district is shown as affected, and the relief required and administered there was larger than in any other place.

41. *Summary of numbers and cost.*—The total numbers relieved gratuitously and by works have been separately shown in paragraphs 21 and 24: the average number in daily receipt of all kinds of relief in the nine districts was 317,687, or about 6·3 per cent. of the whole affected population. The cost of the relief up to the end of December 1877 is thus stated[2]—

| | Rs. |
|---|---|
| Relief-works - - - - - | 93,00,000 |
| Gratuitous relief - - - - - - | 10,00,000 |
| Supervision and establishment - - - | 11,00,000 |
| Total | 1,14,00,000 |

Or about Rs. 2·5 per head on the whole affected population. There was a further sum of Rs. 2,16,000 on account of revenue remitted and Rs. 40,700 was the diminution in the receipts from excise. But the accounts cannot be considered finally closed till it is reported what portion of the suspended revenue has had to be remitted and what the additional cost of relief due to the prolongation of distress in 1878 and 1879 has been. It has already been observed that the cost of relief-works up to the end of March 1878 was Rs. 1,15,67,000, or larger by Rs. 22,67,000 than the figure stated above. Against this expenditure has to be set the value of the works executed, which was calculated at Rs. 81,14,000. Sir R. Temple[3] also claims to bring to account part of the increased receipts from the guaranteed railways, which amounted, in the year ending 15th October 1877, to 67 lakhs of rupees. Admitting that the brisk export trade in wheat and oilseeds would have by itself considerably enlarged the receipts, he reckons that 32 lakhs may be set down to this, and 35 lakhs to the famine trade. In any case, however, the Government receives only half the net profit on the railways, so that the whole cannot be taken as a set-off against famine expenditure. And, besides, if it be true that the trade in grain carrying 265,000 tons, thrust aside a trade of upwards of 200,000 tons of wheat and oilseed which had to be refused transport, and part of which no doubt took cart and thus made its way to Bombay, a still further deduction from the famine gains has to be made. On the whole, it may be admitted that the Government probably received some set-off by the increased traffic, but the actual figure is too uncertain for any definite estimate to be made here.

42. *Mortality.—The Test Census.*—The main set-off however for famine expenditure consists in the fact of having saved the lives of the people. On this subject a considerable

[1] T., para. 13. [2] T., p. 36. [3] T., 86.

amount of research has been made. A test census was held in January 1878 in five of the districts in which famine had been severest: and in each case two talukas were selected, one of which was supposed to be the worst and one to represent the average of the district. The result of the test census was as follows:—

| District. | Taluka. | Census of February 1872. | Census of January 1878. | Loss. | Percentage of decrease. | Loss of affected portion of district reckoned at the same percentage. |
|---|---|---|---|---|---|---|
| Sholapur | Sangli | 62,690 | 60,640 | 2,320 | 3·7 | — |
| | Madha | 103,981 | 83,317 | 20,664 | 19·9 | — |
| | Total of District | 718,000 | — | — | 13·8 | 99,084 |
| Satara | Man | 62,198 | 54,686 | 7,512 | 12·1 | — |
| | Khatau | 81,950 | 73,668 | 8,282 | 10·1 | — |
| | Total of affected part of District | 461,000 | — | — | 11·6 | 53,476 |
| Kaladgi | Bagalkot | 110,185 | 97,177 | 13,008 | 11·8 | — |
| | Badami | 114,288 | 90,489 | 23,799 | 20·8 | — |
| | Total of District | 816,000 | — | — | 16·4 | 113,824 |
| Belgaum | Athni | 114,677 | 99,554 | 15,123 | 13·4 | — |
| | Sampgaon | 131,504 | 125,804 | 5,700 | 4·3 | — |
| | Total of affected part of District | 501,000 | — | — | 8·4 | 42,084 |
| Dharwar | Ron | 73,503 | 68,065 | 5,438 | 7·4 | — |
| | Kod | 79,099 | 80,472 | +1,373 | +1·7 | — |
| | Total of affected part of District | 630,000 | — | — | 2·6 | 16,380 |
| | Grand Total | 3,126,000 | — | — | 10·7 | 344,848 |

This shows that there were approximately fewer people by 344,000 in the worst part of those five districts than there had been in February 1872. But what proportion of those had died, and what proportion had emigrated and were still alive and likely to return in better times, is uncertain. The district officers report that many emigrants have returned since the test census was taken.

43. *Mortuary statistics.*—The second source of information on this subject is derived from the mortuary registration, which have been carried on for more than ten years, and having reached a very fair degree of efficiency has now become an important and valuable key to reveal facts which have been concealed in all previous famines. An extract from a note written on the mortality in all India is appended to this history: and it is sufficient here to note the prominent facts which have to be dealt with. The number of deaths registered in the whole province rose from 343,561 in 1876 to 601,278 in 1877 and 503,883 in 1878: being an excess during the two years of 418,039. But the true number of annual deaths has never yet been recorded: it is believed that the real death-rate is about 35 per mille per annum: and if so only about two deaths out of every three that occur are recorded. Supposing that the same error existed in 1877 and 1878, the true number of deaths that occurred in those years must have been 1,782,510, against an average (at 35 per mille) of 980,000: the excess deaths therefore were 800,000. Looking back to the five districts in which the test census was taken, the recorded mortality in them was—

| | Deaths. | Per mille. |
|---|---|---|
| In 1876 | 126,489 | 27·9 |
| 1877 | 324,241 | 71·7 |
| 1878 | 178,302 | 39·9 |

being an excess of 249,569 over the death-rate recorded in 1876. If the same assumption be made that the true average mortality is, at 35 per mille, 157,270 in these districts, and that the registration of 1877–78 was as faulty as that of 1876, then the true mortality of those two years was 630,000, being an excess of 315,000 over that of ordinary years. This does not fall far below the loss shown by the test census. The propriety of adopting this method of calculation and of assuming that the registration of 1877–78 was faulty in the same ratio that that of the previous year had been, is disputed by the Bombay autho-

rities. o It is maintained that the registration of the famine years was better than in ordinary years, because attention was specially drawn to the subject, and very strict orders given regarding the duty of recording all deaths. This no doubt is true, but, on the other hand, the difficulty of accurate registration was greatly increased by the emigration and wandering, and all the deaths of unknown people in out-of-the-way corners and by-roads are hardly likely to have been brought on the record.

44. *Birth statistics.*—Another interesting and comparatively novel point brought out by these figures is the effect of famine on the reproductive powers of the race. In the nine famine districts the birth-rate fell from 26 per mille in 1876 to 20·3 per mille in 1877 and to 13·8 in 1878 : and it is calculated that altogether the number of births in those two years was less by about 200,000 than it is in two average years. The check to the ordinary birth-rate has not ceased to operate, but is believed to be still observable in 1879.

45. *The relation of the mortality to the famine administration.*—Granting, however, that the mortality was as great as has been represented, the question still remains how far it can be attributed to the famine at all, or if so attributed, whether it was avoidable by a more perfect system of relief administration, or whether it was the inevitable consequence of the same climatic irregularities which produced the drought. The first and most extreme view is taken by Sir R. Temple, in his minute of 20th August 1878, in which, by deducting the deaths from cholera and small-pox as due to specific epidemics altogether unconnected with famine, and a certain portion of the deaths from fever, which was unusually severe, he reckons the deaths really due to famine in 1877 as about 100,000, of which 50,000 are known to have occurred within the relief-houses. To this it is answered that the facility with which people succumb to these epidemics is of itself one of the effects of famine, being due to weakness and want of food. Thus Dr. Cunningham, Sanitary Commissioner with the Government of India, writes[1] :—

To me it seems impossible to dissever the prevalence of any disease from scarcity or famine pressing on a population at the time. Prevalence of disease means either (1) a generally unhealthy year, generally unhealthy from causes which are still extremely obscure; or (2) insanitary conditions in the locality otherwise known as local disease causes ; or (3) unfavourable condition of the people themselves. These causes run into one another, that is to say, they may all three be present and more or less active at the same time, so that it may be and probably will be impossible to decide how much of the sickness and mortality ought properly to be ascribed to each. But the third cause, when it exists, can never be ignored altogether. If the people are in an unfavourable condition, and there can be no condition more unfavourable to health than want of food, then this condition must have its influence, and in all probability a very great influence, on the extent and severity of the prevailing sickness, by whatever name it may be called, whether cholera, or small pox, or anything else.

The most recent contribution to the discussion is that of the Army Sanitary Commission, who in their review of Dr. Hewlett's report for 1877 point to the abnormal prevalence of specific epidemics as evidence of an insanitary condition in the air and water, due to the seasonal irregularity and the deficiency of rain, the deadliness of which no administrative measures can fight against.

They show that, separating the famine from the non-famine districts, the mortality from different causes has been as follows :—

| Disease. | Ratio per Mille. | |
|---|---|---|
| | Famine Districts. | Non-Famine Districts. |
| Cholera - - - - | 5·8 | 1·8 |
| Small-pox - - - - | 2·4 | 1 |
| Fevers - - - - - | 28 | 13·7 |
| Bowel complaints - - - - | 5·9 | 1·6 |
| All causes - - - - | 55 | 35·2 |
| Per cent. of epidemic deaths to total deaths - - - | 77 | 51·5 |

They hold that as cholera decreased in intensity while the famine increased, it should be "eliminated from the deaths specially due to privation," though they also say that "food scarcity and what led up to it in these districts acted fatally on all the chief death causes, specially on those registered as cholera, fevers, and bowel complaints."[2] They wind up with the following conclusions :—

(1) The year was a great epidemic year all over the south of India.

(2) The rainfall of 1876 was only half the average of the preceding five years. In the most severely affected district no more than 4·76 inches fell. Deficient rainfall leads not only to failure of crops, but to failure of water supply and impurity of all domestic water sources. The two results must be considered together in estimating the causes of mortality during the famine year.

(3) So far as concerns the food supply of the people, the abstract already given shows that the price of food during the months of greatest scarcity rose nearly fivefold, and this among a people having few or no resources to fall back on.

[1] 26th October 1878 (see my note on vital statistics, para. 26).
[2] See paras. 14 and 15 of memorandum.

(4) The disease group which showed the most direct relation to the price of food was "bowel complaints," and to this fact must be added the result of Dr. Douglas Cunningham's discovery of the relation of deficient food to permanent pathological changes in the digestive organs, leading to death.

(5) The "fever group" increased in fatality with the rise of prices in 1877, but together with increasing scarcity there came rainfall in augmented proportions month by month, with great increase monthly of fever mortality, a usual consequence of rain after drought.

(6) The mortality from Cholera did not increase with the rise in the price of food. It was lowest at the time of highest price, but it fell rapidly when the amount of rain was greatest.

With these facts before us, it is impossible to deduce from them the absolute mortality due to food scarcity by itself, which, after all, was only one of the elements in the question. The primary cause of the entire calamity was want of water for cultivation and for domestic use. To this added cause in 1876 it was due that the crops failed and scarcity prevailed in the following year. To the same cause was due, as already shown, the aggravation of cholera, which ceased when rain fell, and also the augmentation of fever with heavy rainfall after drought. If every one had been sufficiently fed in 1877, most of the mortality and its causes would have been left untouched. And so far as concerns the food supply, the facts in Southern India all point in the same direction, and that is, that there is a stage of privation which, if once passed, renders any relief measures in the way of increase of food not only useless but a cause of death, and hence, whenever deficient rainfall in one or several years bodes scarcity during the years following, the fact of the diminished rainfall must be taken as the index of famine and not the scarcity, and provision made accordingly.

*General Conclusion as to the Famine Policy of the Bombay Government.*—No system can be considered successful which does not steer evenly between these two dangers, avoiding on the one hand the evil of relieving the population in a way which shall not entail enormous expense on the State and the certainty that much of that expenditure will go into the pockets of people who are not in absolute want, and on the other hand the danger of deterring them by severe and vexatious discipline from accepting the offered relief. If the Bombay Government erred at all it may have been in the latter direction, and it is possible that sufficient attention was not paid to the duty of insisting that the relief it offered was accepted. But admitting this, it may still be asserted that the Government deserves the credit of having done more than ever was done before to reconcile the requirements of the pauper with the necessities of the State: and to work out a system under which a sufficient amount of State-help is offered to those who show, by submitting to moderate and reasonable restrictions, that they really stand in need of relief.

30/8/78. C. A. E.

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## Section 4.—Hyderabad.

[Materials—(1). A general report by Maulvie Mehndi Ali, Secretary to Government in the Revenue Department, (2) and (3) Reports by Mr. G. Palmer, and Maulvie Mushtak Ali, on the relief-works and poor-houses respectively.]

*The Famine Tract.*—The drought of 1876 extended to the southern half of the Hyderabad territory, that is, to the tract lying in the angle between the famine districts of Bombay, Ahmednagar, Sholapur, Belgaum, and Dharwar, on one side, and those of Madras, Bellary, and Karnul, on the other: its boundary may be roughly defined by a line running through Hyderabad City, east-south-east and west-north-west. This tract included eight out of the seventeen districts of which the State is composed; but the greatest intensity of famine prevailed in the south-east angle between the Tunga-Bhadra and the Kistna, known as the Raichor Doab. The following are the approximate statistics of area and population:—

| District. | Affected. | | Most affected. | | Supposed Average rainfall. | Rainfall of 1876. | Results. |
|---|---|---|---|---|---|---|---|
| | Area. | Population. | Area. | Population. | | | |
| Raichor - - | 2,752 | 296,000 | 2,752 | 296,000 | 18 | 13·13 | Nearly total failure. |
| Linsugur - - | 2,264 | 252,000 | 2,264 | 252,000 | 18 | 5·45 | Total failure. |
| Nagar Karnul - | 5,184 | 157,000 | — | — | 24 | 13·74 | Partial failure. |
| Nalgunda - - | 7,424 | 226,000 | 544 | 40,000 | 24 | 14·25 | Ditto. |
| Shorapur - - | 2,112 | 272,000 | 512 | 61,000 | 18 | 7·55 | Considerable extent of failure. |
| Gulbarga - - | 3,456 | 198,000 | — | — | 20 | 12·38 | Partial failure. |
| Naldrug - - | 3,420 | 267,000 | 416 | 40,000 | 22 | 14·0 | Ditto. |
| Bhir - - - | 4,096 | 258,000 | 454 | 40,000 | 22 | 17·9 | Ditto. Western portion worse. |
| Total - | 30,708 | 1,926,000 | 6,942 | 729,000 | — | — | |

In one part of the Lingsugur district it was estimated that the crop was altogether lost; in the rest of the "most affected part," about one-fourth of the average harvest was gathered in, and in the remainder of the famine tract the loss was estimated at only one-third. The two previous years had been fairly good; stocks were large and prices were low. Not much is known of the average rainfall, as rain gauges have only lately begun to be used; but since July 1875 the record has been carefully kept at the head-quarters of each district, and the figures for 1876 may be relied on—

| Months. | Raichore. | Lingsugur. | Nagur Karnul. | Nalgunda. | Shorapur. | Gulbarga. | Naldrug. | Bhir. |
|---|---|---|---|---|---|---|---|---|
| June - - - | 5·62 | 2·88 | 3·11 | 2·28 | 2·38 | 3·84 | 5·13 | 3·96 |
| July - - - - - | 1·74 | 1·00 | 4·89 | 4·02 | 2·33 | 2·35 | 2·12 | 8·01 |
| August - - - | 1·43 | ·39 | 3·28 | 3·92 | 1·07 | 2·26 | 3·61 | 3·40 |
| September - - - - | 3·92 | 1·15 | 1·57 | 1·97 | ·82 | 2·61 | 2·37 | 2·34 |
| October - - - | Nil | ·03 | Nil | Nil | ·09 | ·28 | Nil | ·18 |
| November - - - - | Nil | Nil | Nil | 1·16 | Nil | Nil | Nil | Nil |

2. *Brief History of the Famine.*—The first alarm was given in October 1876 by the district officers of Raichor, Lingsugur, and Bhir, who reported an utter failure of the kharif. On this a circular was issued by the minister, Sir Salar Jung, containing the following instructions:—No interference was to be permitted with prices of food grains; useful public works were to be opened in districts where relief was wanted and ordinary works to be stopped in other parts; and weekly reports were called for from all districts on points indicative of the condition of the country. A central relief committee was appointed to carry out these instructions, and special officers were deputed to report on the state of things in the parts threatened. In January 1877 (on the 11th and 12th), Sir R. Temple paid a visit to Hyderabad and wrote a minute describing the condition and prospects of the country, and the arrangements made for administering relief, which he considered "creditable to the prudence and fore-"sight of His Highness the Nizam's Government." At this time (he was told) there were about 5,000 people[1] on the relief works, and it was estimated that at most 25,000 in all would require relief. Confidence was felt that there would be no dearth of food, as local stocks were large and the produce of the northern districts good, in fact, exportation was still going on briskly into the Madras country. On 13th March the Resident, Sir R. Meade, sent up a report to the Government of India. The rabi had then been harvested and was generally good, though there had been more or less failure in the affected districts; want had nowhere "arisen to a condition of actual famine, and the "area in which it prevails is much more circumscribed than was thought to be the case" at first. On the 6th February, 26,000 people had been employed on the relief-works, of whom 11,000 were emigrants from British territory; and it was in contemplation to establish poor-houses for the helpless poor; there had been a small emigration of about 9,000 people into British districts, balanced by an immigration from those districts of 28,000. Famine was confined to an area of 3,400 square miles, and a population of 360,000 people,[2] and no case of starvation had been reported. In the five months ending with January 1877, 40,000 tons of food grain had been exported from the State, and yet jowari was selling in most parts at 9 to 10 seers, and the highest quotation was 9 seers. It was estimated that the number to be provided for in the hot months would not exceed a daily average of 43,000. Poor-houses were opened at Raichor in March, and at other places in April and May, and these and the relief-works were visited at different times by various members of the relief committee. The worst months were July and August, when the rain threatened to hold off a second time, but at last in September it began to fall abundantly, and in November all relief was closed, the numbers having by that time dwindled down to a minimum: only a few paupers remained on in the poor-houses till January 1878.

3. *Administrative measures. Relief works.*—The relief-works were carried out by the officials of the Public Works Department. A set of rules was issued in February, the principal heads of which were as follows. Every applicant for relief was first to go to a Civil officer, who would enquire into his necessity and if satisfied would register him in a book and give him a metal ticket with a number corresponding to that in the register, on presentation of which he would be received on the works. There he would be placed

[1] The real number was 20,000, *see* page 54, M.A.

[2] I have not followed this statement in drawing up the table in the preceding paragraph, as it was obviously far short of the truth.

in a gang, his task set him, and a ticket given him in the evening, on presentation of which to the Civil officer he would receive his pay. The wage was fixed at 2 annas (or $2\frac{1}{4}$ annas afterwards) for a man, $1\frac{1}{2}$ annas for a woman, and 1 anna for a child: this was afterwards raised when prices grew dearer to 2 annas 7 pie for a man, $1\frac{3}{4}$ for a woman, $1\frac{1}{4}$ for a child, the intention being that a man should be able to purchase two pounds of jowari—which was a little more than was required for his food, and left a margin over for salt, spices, &c. Nothing is said in the rules as to fining labourers for short work, but the District Engineers were reminded that "the object is to obtain a fair "amount of work for the money expended, and to prevent the cost of works carried "out as famine relief from exceeding the estimates at the ordinary rates." Mr. Palmer states that this attempt to regulate admission to the work by the personal knowledge of the relieving officer did not succeed well: "many people obtained employment on "famine works who really were not in that state of distress that warranted relief being "given to them; many possessed jewels and ornaments, and many were said to be the "wives of policemen, sepoys, &c." The ticket system failed from the difficulty of supplying enough tickets, but daily payments were always made. With regard to the work done, Mr. Palmer observes[1] that including all costs of establishment, the rates were intended to be—

Digging moorum or gravel, for metalling the roads, 3 cubic yards per local rupee.
Digging black earth; $7\frac{1}{2}$ cubic yards per local rupee.
Tamping and watering moorum, Rs. 3-12-7 per thousand superficial feet.

"Work, however, was never found to be done so cheaply as this, no doubt individual gangs could do it and frequently did, but the exigencies of famine works, such as shifting gangs to different parts of the work, time taken up in registration, time-keeping, and payment, giving coolies unnecessary work to do for the want of tools or the want of space to work in, keeping many coolies idle for similar reasons, want of sufficient skilled supervision, and many other causes, prevented these rates from being obtained throughout a work."

The actual value of the work done is shown in the following table[2]:—

| District. | Earth work in cubic yards per rupee. | | Road repairs per mile. | | Remarks. |
|---|---|---|---|---|---|
| | Ordinary rates. | Famine rates. | Ordinary. | Famine. | |
| | | Rs. A. P. | | Rs. A. P. | |
| Lingsugur | 0 2 0 | 0 14 1 | *300 | 2,873 3 2 | *The rate Rs. 300 per mile is what would generally be allowed in ordinary times for the kind of work that the famine coolies were expected to do. They, however, frequently did more than this and reconstructed portions the repairs only of which had been previously allowed for. |
| East Raichor | | 0 3 11 | | 2,370 13 8 | |
| Shorapur | | 0 3 3 | | 2,768 3 1 | |
| Gulbarga | | 0 10 1 | | 743 0 0 | |
| Naldrug | | 0 4 0 | | 991 0 1 | |
| Bhir | | 0 4 4 | | 414 9 9 | |
| Nalgunda | | 0 2 8 | | 256 8 7 | |
| Nagur-Karnpl | | 0 2 5 | | — | |

4. *Poor-houses.*—Inthe poor-houses relief was confined to the helpless and to those who were unable to perform any but a very light task. Residence was not insisted on, but cooked food was given, the following were the quantities of jowari flour in each ration:—

| | Light-workers. | Non-workers. |
|---|---|---|
| Males above 15 | $1\frac{1}{2}$ lb. | 1 lb. |
| Females and children between 12 and 15 | $1\frac{1}{4}$ lb. | 1 lb. |
| " " " 6 and 12 | | $\frac{3}{4}$ lb. |
| " " " 3 and 6 | | $\frac{1}{2}$ lb. |
| Below 3 | | $\frac{1}{4}$ lb. |

To every lb. of jowari was added 90 grains (1 tola) of salt and a small quantity of condiments (chatni) thus composed—

| | Tola. |
|---|---|
| Salt | $\frac{1}{2}$ |
| Chilies | 1 |
| Tamarind | 1 |
| Onions | $\frac{1}{2}$ |

The paupers were separately classed as Hindus, Musalmans, and Pariahs, separate sitting places were provided for them to take their food in, and care was taken that the food should be separately cooked by the proper people. Separate sheds also were erected within the enclosure, in which members of those different classes might sleep if

[1] M.A., p. 13. [2] M.A., p. 61.

they chose, but residence was not made a condition of relief. The reports do not mention whether any dislike was popularly felt towards this system. Light work in making ropes and mats, and baskets, &c., was provided as far as possible. The total value of the work thus turned out was Rs. 20,074, after deducting the cost of the raw material. Admission depended partly on the applicants' poverty, into which enquiry was made, and partly on the medical officer's certificate that he or she was unfit for regular work; and the reports give the impression that the right of any applicant to receive gratuitous relief was canvassed with some severity. Besides the inmates of poor-houses, 1,265 "pardanashin" women received a money wage of Rs. 2 to Rs. 2–8 a month on the certificate of three respectable residents: an attempt to exact some spinning work in return for this relief was defeated by the almost unanimous vote of the Committee. About Rs. 20,000 were also spent in charitable relief in other places where poor-houses were not established. The following extract from Maulvie Mushtak Hosein's report gives some further information about the poor-houses[1]:—

"The total number of the poor amounted to 63,009 of whom 12,049 or 20 per cent. were adult males, 23,252 or 35 per cent. adult females, and 27,708 or 45 per cent. children, or one-fifth of the poor-house inmates were males, one-third females, and one-half children. The great preponderance of the last was owing to this circumstance that people who could themselves pick up a livelihood elsewhere sent their children to the poor-house, that they might so lessen their own burden, and the excess of females over males is accounted for by the obvious reason that the former have, of course, fewer openings than the latter to earn their bread. Of the gross number 25,225 or 40 per cent. were obliged to work, the rest were non-workers. This proportion shows that children also were included in the former class when they were not too tender of age to turn their hands to any profitable occupation. Classified according to their religious persuasions, 16,822 or 26 per cent. of the inmates were Mahomedans, 33,320 or 53 per cent. Hindus, and 12,867 or 22 per cent. of other low castes. Analysed according to their professions there were 14,892 or 22 per cent. cultivators, 38,182 or 62 per cent. labourers, and 9,935 or 16 per cent. belonging to various other professions. Again 60,496 were subjects of His Highness the Nizam, and 2,513 were British subjects. Of the latter 1,090 came from Kaladgi, 483 from Sholapur, 151 from Karnul, 335 from Adoni, 289 from Bellary, and 165 from other districts.

"The total number of deaths among those who received poor-house relief amounted to 2,293. This gives a percentage of 3·6 deaths, calculated on the total number of inmates, i.e., 63,009. The mortality does not appear to be in any degree excessive. Considering that many of those who died were brought in in a state of extreme exhaustion consequent upon starving or fatigue, and that others again came afflicted with the germs of one or another fatal disease, such as cholera, fever, &c., the number of deaths seems very small. * * * *"

5. *Statistics of relief.*—The following table shows the average daily number employed on works or fed in poor-houses for each month of the famine, together with the average monthly prices of jowari and rice at Hyderabad. The worst month was July, when the stoppage of the rains seemed to threaten another year of famine. The total average number of persons relieved during the ten worst months, January to October, was 26,000, or 1·36 of the entire affected population. There is remarkably little difference between the cost per head on relief-works and in poor-houses.

| Months. | Average daily number on works. | Average daily number in poor-houses. | Price at Hyderabad of | |
|---|---|---|---|---|
| | | | Jowari, seers per rupee. | Rice, seers per rupee. |
| August 1876 | — | — | 17½ | — |
| September „ | — | — | 14½ | 8 |
| October „ | — | — | 9 | 6 |
| November „ | — | — | 8 | 5½ |
| December „ | 7,516 | — | 9 | 5¾ |
| January 1877 | 19,790 | — | 8¾ | 5½ |
| February „ | 21,042 | — | 9¼ | 6 |
| March „ | 8,321 | — | 10¼ | 5½ |
| April „ | 7,048 | 1,578 | 9 | 5½ |
| May „ | 16,432 | 8,842 | 8½ | 5½ |
| June „ | 25,800 | 11,130 | 7¼ | 5 |
| July „ | 38,434 | 14,561 | 5¾ | 4½ |
| August „ | 29,310 | 10,414 | 5½ | 3¾ |
| September „ | 21,703 | 13,538 | 6 | 4¼ |
| October „ | 6,231 | 4,040 | 7¾ | 4¾ |
| November „ | 80 | 506 | — | — |
| December „ | — | 92 | — | — |
| January 1878 | — | 11 | — | — |
| Grand Total employed or relieved for 1 day | 6,217,738 | 1,998,038 | — | — |
| Average daily number employed for 11 months | 18,290 | — | — | — |
| Average daily number relieved for 10 months | — | 6,471 | — | — |
| Expenditure, Total Rs. | 8,38,122 | 2,44,347 | — | — |
| Average cost per head per diem „ | 0 2 2 | 0 1 11 | — | — |

[1] M.A., pp. 62, 63.

The following statement shows how the relief was distributed over the affected districts :—

| District. | Population. | Relief Works. | | | Poor-Houses. | | |
|---|---|---|---|---|---|---|---|
| | | Highest number employed on any one day. | Average number employed while works were open. | Per-centage of column 3 on column 2. | Number of persons that received poor house relief. | Average number while poor-house was open. | Per-centage of column 7 on column 2. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Raichore - - - | 296,000 | 18,813 | 5,389 | 6·35 | 16,117 | 2,682 | ·90 |
| Lingsugur - - | 252,000 | 19,890 | 6,427 | 7·89 | 26,817 | 3,135 | 1·24 |
| Nagar Karnul - - | 157,000 | 2,072 | 1,268 | 1·31 | — | — | — |
| Nalgunda - | 227,000 | 4,430 | 1,230 | 1·95 | — | — | — |
| Shorapur - - - | 272,000 | 9,730 | 4,122 | 3·57 | 8,091 | 1,005 | ·36 |
| Gulbarga - - - | 198,000 | 5,905 | 2,855 | 2·98 | 7,492 | 856 | ·43 |
| Naldrug - - - | 267,000 | 2,864 | 1,163 | 1·07 | 1,944 | 1,022 | ·38 |
| Bhir - - - | 258,000 | 2,852 | 2,602 | 1·11 | 2,548 | — | — |
| Total - | 1,927,000 | 66,556 | 25,056 | 3·45 | 63,009 | 8,700 | ·45 |

6. *Emigration.*—The returns prepared by the officials of the State show that while 14,500 residents of Hyderabad emigrated to British territory, the number of British immigrants was 57,400. The immigrants came from Sholapore and Ahmednagar on one side, and from the adjoining Madras Districts on the other. On one occasion the Madras Government was requested to recall its own subjects, but with this exception the principle adopted by the State was that the relief measures should be equally open to all applicants, from whatever part they came. On this subject Maulvi Mehndi Ali writes as follows :—[1]

"The Madras Government frequently complained and earnestly urged the calling of such of His Highness's subjects who, living on the borders of the Madras territories, had proceeded to the Madras relief-works, simply because they were nearer their homes and could get to them without experiencing any great inconvenience. This Government, on the other hand, has always held that in such critical times the ryots should be allowed perfect freedom to proceed without restraint wherever they would with the view to their own convenience in securing their livelihood. * * * * * Nawab Wahid Munawar Khan, Sudder Talukdar of the North-Western Division, gives an account of what he saw with his own eyes at Asteh in the Bhir District. He says 'the people of Asteh treated their 'emigrant brethren with remarkable kindness. They allowed many of them to take shelter in their 'own lodgings, gave protection to their cattle, and employed such as were willing to labour in 'their fields.' There is, however, nothing strange about the matter, inasmuch as the poor cultivating populating of India are always accustomed to show sympathies towards their brethren in distress."

7. *Land revenue remissions.*—The land revenue of the eight affected districts had been Rs. 82,78,301 in 1875–6, but in 1876–77 only Rs. 60,91,094 were collected, and in 1877–78 only Rs. 74,58,876, making a deficit in the two years of Rs. 30,06,632, or thirty lakhs. Of this 18¾ lakhs were remitted, and the balance 11¼ lakhs has been suspended, and it is expected that three-fourths of it will have to be remitted. If this expectation is realised, the loss in revenue will have been 27 lakhs of rupees, or 33 per cent. of the ordinary Government demand in the parts affected.

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[1] Mr. W. Oldham, B.C.S., special relief officer, Bellary, said in his evidence before the Famine Commission (4th February 1879): "The crowds of foreigners, subjects of His Highness the Nizam, became so great, that in order to distinguish them from Bellary people, the relief had to become parochial. Between July and November 1877, I picked out 80,000 Hyderabad people. These people came mostly from the territories of the Rajahs of Godwal and Sundanur, touching our border, where no relief was given, except that there was a kitchen in each ; but I think the relief was mainly confined to Brahmins and Lingayets. Many also came from Sir Salar Jung's own zemindari, Kopal, where no relief work was opened. At first I took all on, but when the numbers became unmanageable, I separated them and marched them back . . . . . The first great body of foreigners I dealt with by giving them three days' pay, closing the work, telling them they must go back home, and stopping the ferry over the Tungabhadra to prevent their returning to Adoni. This caused great suffering; crowds of Hyderabad people declared they were residents of certain villages in Adoni, received tickets for village relief as such, were disavowed by the Reddis when they got there, and came back to the works which they found closed. After seeing that this plan failed, I kept all foreigners on the works, and communicated with Hyderabad, who after two months' delay appointed an officer to receive emigrants back. I then marched them back and made them over to that officer, who gave a receipt for them. I got receipts for about 14,000. Only one old woman was sent back to me from Hyderabad."

8. *Summary of cost of relief.*—The entire cost of the famine to the Hyderabad State is thus set forth :—

| | Rs. |
|---|---|
| 1. Relief-works | 8,38,122 |
| 2. Extra establishments on do. | 80,295 |
| 3. Relief-works (not special) under Public Works Department | 1,23,870 |
| 4. Poor-houses | 2,44,347 |
| 5. Orphans | 18,687 |
| 6. Miscellaneous charity | 70,185 |
| 7. Revenue remitted | 27,00,000 |
| Total | 40,75,506 |

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## Scarcity in the North-Western Provinces and Oudh.

## 1877-78.

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[The materials for this paper are—(1) the recorded Proceedings of the Government of India; (2) the chapter in the Administration Report of the Province which gives an account of the scarcity down to the end of March 1878; (3) a file of reports from Commissioners sent by Mr. C. Robertson, Secretary to Government; (4) the provincial weekly progress reports; (5) two statements drawn up by the North-Western Provinces Government, showing the monthly numbers on relief and the amount expended.]

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1. *Condition of the Province before the drought.*—The seasons of 1874, 1875, and 1876 were favourable in the North-Western Provinces and Oudh, and the harvests of those three years were considerably above the average. The stocks, depleted by the drought of 1873 and the drain to Behar, were thus replenished, and grain became abundant and cheap, prices being lower than they had been for more than twenty years. This prosperous condition extended to the Punjab also; and wheat being at this time unusually dear in England, a great export of grain for the first time set in in that direction. At the same time the wants of Madras and Bombay invited the influx, not of wheat or barley, which are little consumed there, but of gram and millets; and thus the country was drained simultaneously both of its best and its commoner kinds of grain by a process which poured large sums of money into both provinces, but necessarily brought down the superbundant food-stocks. The trade was so active, that the railways were unable to carry off the quantities of grain brought for export, so that much of it was forced to travel by river and canal; and it was hoped by many that the new demand in England for Indian wheat would become permanent, to the great advantage of the agricultural interest.

2. *The drought of* 1877.[1]—This hope was frustrated by the extraordinary failure of the southern monsoon over all Upper India, which, as in former occasions, followed, with a year's interval, on the equally extraordinary failure in Southern India. The rainfall in January, February, and March had been above the average, and had done some injury to the splendid spring crops; April and May were abnormally cool. In June the southern monsoon set in with signs of great weakness and irregularity, which characteristics adhered to it throughout its duration. In the North-Western Provinces and Oudh, the total rainfall of June at Allahabad, Jhansi, and Bareilly was from half to three-quarters of the average: elsewhere it was only one-fourth. In the first week of the month about half an inch fell in the Benares, Jhansi, Meerut, and Rohilkhand Divisions; and towards the end of the month about two inches fell almost everywhere, except in the Agra and Rai Bareli divisions, but not a drop was registered in Aligarh,

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[1] Compare—
- 1782 - Madras and Bombay.
- 1783 - North-Western Provinces and Punjab.
- 1802–3 - Madras and Bombay.
- 1808–4 - North-Western Provinces.
- 1824 - Madras and Bombay.
- 1825 - North-Western Provinces.
- 1832 - Madras and Bombay.
- 1833 - North-Western Provinces.

Etawah or Banda. During July the Bundelkhand district and the Agra and Meerut divisions were almost rainless; Rohilkhand, Northern and Eastern Oudh, the Benares division, and the eastern half of Allahabad received a moderate supply, mainly during the first four days of the month. There was another short period of rain about the middle of the month, distributed pretty generally, but its amount was small. Taking the Province as a whole, only a third of the average amount of rain was registered. Mainpuri alone marked no rainfall. In the first four days of August rain fell in the Benares and Allahabad divisions and in Bundelkhand, averaging about half the usual amount. In Rohilkhand and Oudh the rain was less. In Agra and Meerut the weather was extremely dry. Meerut, Aligarh, and Muttra did not register any rain. September was even drier than August. A few local showers fell in the first three days of the month, and again from the 7th to 11th, benefiting chiefly the Benares division and Bundelkhand. Not a drop was registered in Meerut, Aligarh, Bareilly, Muttra, Farukhabad, and Sitapur; and less than half an inch in Bijnor, Budaun, Agra, Mainpuri, Etawah, Etah, and Allahabad. The whole Province out of an average of 10 inches received only 2. Nor was the deficiency of rain the only affliction. Throughout July, August, and September, with little intermission except during the intervals of showers, the wind blew from the west scorching and dry, and shrivelled up the growing plants, threatening to kill even those that were constantly irrigated. October, however, was distinguished by singularly opportune rain, which, begining at Bombay and Surat on the 4th, reached the Central Provinces, Central India, North-Western Provinces, and Punjab simultaneously on the 6th, and was heaviest on the 7th and 8th. The figures given below show each day's rain-fall, taking the average of the whole Province. Coming at a time[1] when all hope of rain had been abandoned, in a month when the average amount gauged is only 1·70 inches, and that is due to exceptionally wet years, this downpour was of inestimable advantage to the Province, and turned to a scarcity what would otherwise have been one of the greatest famines of the century. In December again there was an unusually heavy rainfall, amounting to above three inches in Meerut, Rohilkhand, and Agra, but lessening to the eastward, till in the Benares division it was less than half an inch. Rain continued to fall in January and February, the amount in the latter month being so excessive, and so combined with damp cloudy weather, as to do much harm to the spring crops. The following table shows for each important district the average amount registered during each month compared with the actual downfall of 1877 :—

| | | June. | July. | August. | September. | October. | November. | December. | Total June to September. |
|---|---|---|---|---|---|---|---|---|---|
| Saharanpur | Average | 3·91 | 12·53 | 9·51 | 4·12 | 0·37 | 0·81 | 0·60 | 30·07 |
| | 1877 | −2·11 | − 7·73 | − 7·61 | −2·32 | +1·43 | −0·41 | +6·60 | −19·77 |
| Meerut | Average | 3·62 | 9·44 | 6·49 | 3·66 | 0·52 | 0·02 | 0·36 | 23·21 |
| | 1877 | −1·12 | − 8·64 | − 6·49 | −3·66 | +5·48 | −0·02 | +3·44 | −19·91 |
| Aligarh | Average | 2·20 | 7·95 | 6·31 | 4·14 | 0·63 | 0·03 | 0·40 | 20·60 |
| | 1877 | −2·20 | − 4·45 | − 6·31 | −4·14 | +2·97 | −0·03 | +1·60 | −17·10 |
| Bijnor | Average | 4·12 | 11·45 | 9·32 | 5·90 | 0·43 | 0·07 | 0·34 | 30·79 |
| | 1877 | −2·12 | − 9·75 | − 8·42 | −5·40 | +1·57 | −0·07 | +2·86 | −25·69 |
| Moradabad | Average | 4·66 | 14·19 | 8·90 | 5·42 | 0·84 | 0·08 | 0·44 | 33·17 |
| | 1877 | −3·86 | − 6·19 | − 6·20 | −4·02 | +6·86 | +0·82 | +4·76 | −20·27 |
| Bareilly | Average | 5·51 | 14·67 | 8·62 | 6·73 | 1·11 | 0·06 | 0·33 | 35·53 |
| | 1877 | −2·92 | −10·97 | − 5·52 | −6·73 | +5·49 | −0·06 | +1·87 | −26·14 |
| Budaun | Average | 3·65 | 10·70 | 8·07 | 5·93 | 0·71 | 0·06 | 0·42 | 28·35 |
| | 1877 | −3·05 | − 8·20 | − 6·07 | −5·83 | +5·19 | −0·06 | +1·48 | −23·15 |
| Shahjahanpur | Average | 5·09 | 11·50 | 7·70 | 6·71 | 1·22 | 0·12 | 0·44 | 31·00 |
| | 1877 | −2·79 | − 8·90 | − 6·90 | −4·81 | +3·48 | −0·02 | +2·76 | −23·40 |
| Muttra | Average | 2·66 | 9·11 | 7·08 | 4·52 | 0·49 | 0·01 | 0·38 | 23·37 |
| | 1877 | −2·36 | − 8·61 | − 7·08 | −4·52 | +5·81 | −0·01 | +1·42 | −22·57 |
| Agra | Average | 2·94 | 8·92 | 6·85 | 4·88 | 0·36 | 0·03 | 0·01 | 23·59 |
| | 1877 | −2·54 | − 7·32 | − 6·20 | −4·73 | +3·24 | −0·03 | +2·14 | −20·79 |
| Mainpuri | Average | 2·34 | 9·12 | 7·80 | 6·01 | 0·80 | 0·06 | 0·56 | 25·27 |
| | 1877 | −2·04 | − 9·12 | − 6·90 | −5·91 | +3·30 | −0·06 | +2·44 | −23·97 |

[1] October 6th - - - - 0·41
„ 7th - - - - 1·35
„ 8th - - - - 1·14
„ 9th - - - - 0·35
Total - - 3·25

| | | June. | July. | August. | September. | October. | November. | December. | Total June to September. |
|---|---|---|---|---|---|---|---|---|---|
| Farukhabad | Average | 3·19 | 9·51 | 7·34 | 6·12 | 1·37 | 0·71 | 0·46 | 26·16 |
| | 1877 | −2·69 | − 6·11 | − 5·04 | −6·12 | +4·73 | −0·61 | +4·64 | −19·96 |
| Etawah | Average | 2·08 | 8·14 | 8·72 | 5·22 | 1·34 | 0·11 | 0·37 | 24·16 |
| | 1877 | −2·08 | − 7·64 | − 8·32 | −5·02 | +4·56 | −0·11 | +2·63 | −23·06 |
| Etah | Average | 1·77 | 9·40 | 7·94 | 4·22 | 1·14 | 0·01 | 0·35 | 23·35 |
| | 1877 | −0·17 | − 6·70 | − 7·74 | −4·02 | +3·76 | +0·09 | +1·75 | −18·63 |
| Cawnpore | Average | 3·24 | 8·88 | 7·61 | 5·21 | 1·00 | 0·08 | 0·24 | 24·94 |
| | 1877 | −2·84 | − 7·18 | − 3·91 | −4·31 | +2·40 | −0·08 | +1·76 | −18·24 |
| Allahabad | Average | 3·53 | 11·17 | 9·40 | 6·26 | 4·75 | 0·09 | 0·15 | 30·36 |
| | 1877 | −1·03 | − 9·07 | − 3·90 | −6·16 | −0·95 | −0·09 | +0·15 | −20·76 |
| Banda | Average | 3·27 | 11·24 | 9·80 | 6·81 | 0·86 | 0·19 | 0·17 | 31·12 |
| | 1877 | −3·27 | − 9·24 | − 3·60 | −0·41 | +1·34 | −0·19 | +0·13 | −16·52 |
| Jhansi | Average | 4·11 | 12·44 | 10·35 | 5·72 | 0·77 | — | 0·22 | 32·62 |
| | 1877 | −2·41 | −11·94 | − 8·05 | −0·32 | +1·53 | — | +0·88 | −22·72 |
| Lalitpur | Average | 5·04 | 14·08 | 10·49 | 5·81 | 0·79 | 0·03 | 0·27 | 35·42 |
| | 1877 | +1·06 | −12·28 | − 5·69 | −5·01 | +1·11 | −0·03 | +2·53 | −21·92 |
| Jaunpur | Average | 4·50 | 9·81 | 10·28 | 7·72 | 2·93 | 0·11 | 0·13 | 32·31 |
| | 1877 | −3·40 | + 0·99 | − 3·08 | −3·72 | +2·87 | −0·11 | +0·27 | − 9·21 |
| Benares | Average | 5·16 | 12·59 | 11·63 | 6·40 | 1·66 | 0·04 | 0·09 | 35·78 |
| | 1877 | −3·76 | − 4·99 | − 2·73 | −2·50 | −0·26 | −0·04 | +0·31 | −13·98 |
| Ghazipur | Average | 4·36 | 10·13 | 9·56 | 6·44 | 2·89 | 0·30 | 0·11 | 30·49 |
| | 1877 | −3·06 | − 7·63 | − 4·26 | −5·54 | −1·49 | −0·30 | +0·64 | −20·49 |
| Gorakhpur | Average | 6·48 | 12·92 | 11·79 | 8·68 | 2·76 | 0·23 | 0·14 | 39·87 |
| | 1877 | −3·88 | − 8·12 | − 7·39 | −5·68 | +0·24 | −0·23 | +1·26 | −25·07 |
| Basti | Average | 5·97 | 15·74 | 11·27 | 9·12 | 2·03 | — | 0·16 | 42·10 |
| | 1877 | −3·97 | −13·04 | − 7·47 | −6·62 | +1·87 | — | +0·34 | −31·10 |
| Lucknow | Average | 5·12 | 11·51 | 11·57 | 8·83 | 2·46 | — | 0·74 | 37·03 |
| | 1877 | −4·92 | − 8·61 | −10·57 | −7·93 | −0·06 | — | +0·96 | −32·03 |
| Fyzabad | Average | 5·16 | 15·31 | 9·83 | 9·84 | 2·06 | — | 0·16 | 40·14 |
| | 1877 | −4·06 | − 9·71 | − 7·43 | −5·64 | +2·14 | — | +0·54 | −26·84 |
| Rai Bareli | Average | 4·50 | 11·90 | 9·31 | 8·61 | 1·68 | — | 0·24 | 34·32 |
| | 1877 | −3·70 | −10·00 | − 7·41 | −7·01 | +0·02 | — | +0·06 | −28·12 |
| Sultanpur | Average | 6·73 | 13·51 | 11·18 | 8·50 | 2·14 | — | 0·18 | 41·92 |
| | 1877 | −6·33 | − 8·11 | − 6·28 | −9·80 | +1·56 | — | −0·08 | −30·52 |
| Sitapur | Average | 6·96 | 11·36 | 10·10 | 7·37 | 1·82 | — | 0·55 | 35·79 |
| | 1877 | −3·76 | − 9·16 | − 9·70 | −7·37 | +2·68 | — | +2·15 | −29·99 |
| Total N. W. P. and Oudh | Average | 4·72 | 12·01 | 10·12 | 10 | 1·70 | — | — | 36·85 |
| | 1877 | 2·27 | 4·42 | 3·35 | 2 | 3·49 | — | — | 12·04 |
| Difference | | −2·45 | − 7·59 | − 6·77 | − 8 | +1·79 | — | — | −24·81 |

3. *Brief History of the Famine.*—The local government was not slow to take notice of the approaching disaster, and to warn its officers to make all preparations in their power. In August instructions were issued calling for estimates of the local food-stocks and of the crops then standing which had survived the drought. On the 22nd of August a report was sent to the Government of India describing the position of affairs; in every part of the province except the Benares division the outlook was most gloomy; in many tracts not a green field was to be seen for miles, and where the great millet crop had dried up, its stalks (which form the usual fodder of the cattle) were found to be poisonous. Emigration had already begun in the trans-Jumna districts; and unless rain fell soon, not only would the kharif be lost, but it would be impossible to sow the rabi except on irrigated land. In the beginning of September the two chief engineers were deputed to make a tour through the province to visit each endangered district, and to decide, in communication with the district officers, what works should be undertaken for relief. No work was to be begun unless it was proved to their satisfaction that there was a section of the population out of work, and unable to buy food at the prevailing rates. If this was established, they had authority to direct the opening of relief-works, choosing first only such smaller projects as would have been undertaken in ordinary course later on, or those which had for their object the immediate supply of the means of irrigation; afterwards, if these should prove insufficient, special larger works would be undertaken, and the plans and estimates of these were to be prepared. The ordinary rate of daily wage or contract pay was to be given. Poor-houses were to be opened where necessary, and takavi advances for digging wells and for seed-grain were to be given. As the result of this tour, relief-works were very generally begun in the end of September, when 27,000 persons were employed on them in the Rohilkhand, Agra,

Meerut, and Jhansi divisions. On the 4th October the Government reported again that the position was getting continually worse. The kharif was entirely lost in unirrigated lands, except in the Benares division and in the east parts of the Fyzabad and Allahabad divisions. Irrigation from wells had been but small, and that from canals had been mainly confined to non-food crops, such as indigo and sugar-cane. Great mortality existed among the cattle from want of fodder, and the prospects of the rabi were most gloomy. But the food-stocks were believed to be still large, in spite of the great export trade at the beginning of the year. Rohilkhand had about three months' supply in hand, and the rest of the country six months. Grain robberies and thefts had been very numerous, and the immigration into the Agra and Rohilkhand divisions were so large that it had been necessary to start poor-houses for the reception of these emaciated wanderers. The entire control of relief operations (subject to the orders of the Lieutenant-Governor) was placed in the hands of Colonel Fraser, the Chief Engineer, by whom a scheme of works was drafted, sufficient to employ $1\frac{1}{4}$ millions people for nine months. Just at this time occurred the fortunate fall of rain which has already been referred to, and which saved the last remains of the kharif and made the sowing of the rabi possible. This immediately brought down prices, relieved the tension and anxiety which had overspread the country, and by giving field employment to the labourers, diminished at once the numbers on the relief-works. On this great change taking place Colonel Fraser again made a tour through the province, to determine what works were required under the more favourable conditions; and it was resolved that as the necessities of the people were obviously less, relief should be given with greater strictness, tasks should be more rigorously enforced, and the wage reduced to a bare subsistence allowance. Under the influence of these rules, combined with the large demand for field labour for irrigation, the relief-works were nearly deserted in the beginning of December; but the rain which fell from the 8th to the 10th of that month, and which was most beneficial to the crops, had the untoward effect of rendering artificial irrigation unnecessary, and of stopping all field employment. The rain, too, was accompanied by intense and searching cold, which told severely on the poorer classes of population, who were all the less able to resist it, in that they had been for some time on reduced rations, had in many cases sold the thatch of their houses, or given it as food to their cattle, and were without the usual supply of straw in which they could lie and cover themselves for want of warmer clothing. In consequence of this the relief-work began to fill again; and the numbers ran up from 17,500 in December to 73,000 in February. These figures, however, by no means represented the total population that was in want of food, as the rapidly rising mortality returns testified; but it was difficult to persuade the people to apply for relief when they saw around them magnificent crops which already produced a supply of green leaves and vegetable food, such as the country people in these months ordinarily mix with their meals, and which bade fair soon to produce an abundant crop of grain. The rabi crop was sown over an unusually large area, and although much injury was done to it by the rainy and cloudy weather of January and February, the outturn was fairly good. As soon as the harvest was ripe, the relief-works emptied even faster than they had filled, and in April the numbers had fallen to 12,500. It was now hoped that the scarcity was almost at an end; and this would probably have been the case had the monsoon of 1878 set in early and favourably; but the North-Western Provinces was doomed to the same experience as that of Madras and Bombay in the preceding year. The rain again held off, or fell in local showers and with discouraging breaks; both prices and the numbers on relief again rose rapidly. The Government, however, had foreseen the contingency, and had prepared a complete and elaborate scheme of large and useful works to be put in hand in case there should be another failure of the rains. Under this scheme the works were divided into four classes. The first or most important and remunerative class provided work for $1\frac{3}{4}$ million people for 200 days, and was estimated to cost $92\frac{1}{3}$ lakhs of rupees at ordinary rates; allowing for the ineffective character of famine labour, it would of course cost more. The main works of which it was composed were seven light railways, several roads, and a partial beginning of the Sarda canal. The second class would employ 600,000 people for the same period, costing 85 lakhs of rupees; its chief component parts were the continuation of the Sarda canal, and a project for the drainage of the East Kali Nadi in the Upper Doab. In the third class the chief items were the navigation canal from Cawnpore to Allahabad, and the Betwa and Ken canals in Bandelkhand; these were to employ 370,000 people. The fourth class consisted of the completion of the Sarda canal and its branches, the West Ramganga canal (in Rohilkhand), and some minor projects. Taking all the four classes together, the scheme of works provided for the employment of 3,880,000 people, or 9·23 of the total population, at an estimated expenditure (at ordinary

rates) of 3¼ millions sterling. The scheme was generally approved by the Government of India, and sanction given to put in hand such of the works in the first section as was deemed necessary, in the order of their utility, subject to their giving the needful occupation to the population of the most distressed tracts. But it was pointed out (2nd July), that the season, though far from good, had by no means declared itself to be bad, and that there was no immediate prospect that any such heroic remedies would be necessary. In effect the numbers which had risen very greatly in July, when the rains seemed too doubtful and capricious to admit of active labour in the fields began to fall off again in August. In that month the rainfall was heavy and general though it ceased prematurely, hardly extending into September; but it secured to the country an average kharif crop, the weeding and cutting of which, together with the ploughing and sowing for the rabi, and the great need of early irrigation on account of the dryness of the soil, created an active demand for labour, and enabled the Government to close its relief works in October. The poor-houses also, which had shared in the upward tendency in July, gradually emptied, and only a few waifs and strays remained to be cared for as late as November.

4. *Extent of loss from drought, and area of severe distress.*—The estimates called for by the circular of August 16th have not been received by the Government of India; and it appears from subsequent letters of the Local Government that, being prepared at a time when the ravages of drought were still going on, they did not represent the whole of the disaster. No definite official statement has been sent up to show the extent of the loss in each district, and it is hardly possible to quantify the loss from the vague and general statements that have been made as to "nearly total failure," &c. The area of severest distress can, however, be more clearly designated. In the Meerut division no part suffered severely; but in the southern portion of Aligarh there was some distress, owing mainly to immigration. In that district the jowar crop was estimated at one-eighth and Indian-corn at five-sixteenths of an average crop.[1] In the Agra division distress was most severe in Agra and Muttra, where the failure of rain was most calamitous (Agra had less than 3 inches and Muttra less than 1 in the 4 rainy months), and the Agra kharif crop was estimated at only 2 per cent. of an average crop.[2] In the Doab part of the division the failure was not so complete; and in Farukhabad most villages had some crop. But only 1·3 inches fell in Mainpuri and 1·1 in Etawah in the four months, so that nothing can have been saved except what was protected by wells and canals. In Rohilkhand the loss of the kharif was greatest in Budaun; but on the other hand that district had an extremely fine rabi crop, much superior to the rest of the division. The Commissioner[3] places his districts in order thus: Bijnor the worst, then Bareilly, Shahjahanpur, Budaun, and Moradabad. In the latter district distress was never severe. In the Allahabad division, Cawnpore and Fatehpur saved some of their kharif crop; but in Banda and in three fourths of Hamirpur it was almost a total failure. Jaunpur lost its rice, but there was no suffering there, and the whole division was very little in need of relief. Jaunpur had over 20 inches of rain, Banda 15, and Allahabad 10. In Jhansi distress was slight, though it had only 10 inches of rain out of an ordinary fall of 32, and most of the kharif was lost. The Benares division had a good deal of rain, comparatively; but all the rice in Azimgarh, Gorakhpur, and Basti was lost, and the rest of the kharif crop was only a quarter of an average. In Oudh, severe distress was confined to a central tract in the Lucknow, Bara Banki, and Rai Bareli districts. Elsewhere it was slight; though the crops were reported a total failure in Sitapur and the western part of the country. In the Fyzabad division and the south-eastern corner of Oudh more rain had fallen and some kharif was harvested. But speaking broadly, severe distress was confined to the Rohilkhand division, Moradabad excepted, the Agra and Muttra districts, and the country lying round the tri-junction of the Lucknow, Rai Bareli and Bari Banki districts. The first is a tract which grows much rice and sugar-cane, and lost heavily by them; the second tract is singularly dry and devoid of wells; the third is almost purely a rice-growing tract. The reports do not seem sufficiently to explain the immunity of the Bundelkhand and Jhansi districts.

5. *Numbers relieved and cost of relief.*—The following statement shows the numbers on each kind of relief for the twelve months from October 1877 to September 1878; and a more detailed table opposite gives the same information for each district. The figures

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[1] Commissioner, 27th January 1879. [2] Commissioner, 8th July 1879.
[3] 6th May 1879.

are not quite complete, as relief was going on in September 1877 and in October 1878; but the numbers thus omitted are small.

| Month. | Average Daily Number on Relief Works. | In Poor-houses. | Registered Mortality per Mille. |
|---|---|---|---|
| October 1877 | 32,631 | 2,700 | 15 |
| November „ | 22,321 | 3,881 | 19·9 |
| December „ | 17,548 | 6,978 | 27·7 |
| January 1878 | 19,486 | 15,618 | 32·7 |
| February „ | 73,111 | 29,930 | 33·4 |
| March „ | 63,743 | 24,590 | 34·2 |
| April „ | 12,444 | 4,252 | 37·5 |
| May „ | 25,707 | 5,562 | 32·6 |
| June „ | 104,589 | 9,397 | 28·8 |
| July „ | 119,918 | 17,685 | 21·8 |
| August „ | 126,824 | 26,351 | 27·1 |
| September „ | 45,687 | 18,105 | 28·8 |
| October „ | — | — | 33·1 |
| November „ | — | — | 30·4 |
| December „ | — | — | 22·2 |
| Total number | 668,688 | 165,049 | — |
| Daily average number for 12 months | 55,724 | 13,754 | — |
| Total expenditure Rs. | 16,00,317 | 391,895 | — |
| Average monthly cost per head | 2–6–3½ | 2–6–0 | — |

6. *Prices.*—The following table shows the course of prices during the period of scarcity. Wheat and barley alone are given as being the dearest and cheapest food-grains in common use, and it is worthy of remark how closely the prices, which in June had been so different, came together in January and February. Jowar and bajra are not quoted, because, though they appeared in the price-currents of the time, they practically ceased to exist, except for purposes of seed-grain—so absolute had been the failure of the crop. In almost every case it will be seen that prices rose rapidly from June to September, fell a little in October and November after the favourable rain; then rose slightly in January, but fell as the harvest came on, and continued to fall till May: then, as the rains held off, they rose again, till they reached their second period of maximum in July, after which they fell steadily, when the rain settled down and the kharif became assured.

| — | June 1877. | | July. | | August. | | September. | | October. | | November. | | December. | | Jan. 1878. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. |
| Meerut | 25·8 | 38 | 21 | 31 | 61·4 | 21·8 | 11·8 | 14 | 13 | 14 | 14·4 | 16·8 | 13·12 | 16·8 | 13 | 17 |
| Bareilly | 18·12 | 28·12 | 17·8 | 27·8 | 14·6 | 20 | 9·11 | 12·8 | 11·14 | 11·14 | 11·4 | 13·12 | 11·4 | 13·2 | 10·10 | 13·2 |
| Agra | 20 | 28·15 | 17·5 | 25·1 | 14·4 | 17·12 | 10·8 | 12 | 12 | 13·8 | 12·8 | 14·8 | 12 | 14 | 11 | 13 |
| Lucknow | 20·8 | 29·9 | 18·11 | 27·4 | 15·2 | 20 | 10·12 | 12·1 | 11·1 | 13·5 | 10·14 | 13·4 | 11·8 | 13·4 | 10·2 | 12·8 |
| Faizabad | 19·8 | 28·8 | 17·4 | 24 | 14·4 | 20 | 11·7 | 14 | 11·11 | 14·3 | 12 | 13·12 | 11·11 | 14 | 10·14 | 12·9 |
| Gorakhpur | 20·2 | 31·8 | 18·6 | 28 | 14·14 | 22·12 | 11·6 | 14 | 10·15 | 12·4 | 10·15 | 12·4 | 10·15 | 12·4 | 11·13 | 14 |
| Allahabad | 17·12 | 28 | 16 | 27 | 14·8 | 22 | 12 | 15·4 | 12·14 | 16·8 | 11·12 | 16 | 11·12 | 15·4 | 11 | 15 |
| Jhansi | 20·15 | 29 | 19·15 | 28 | 15·13 | 19·7 | 11·12 | 13·10 | 13 | 14·11 | 13·8 | 16 | 13·10 | 13·6 | 13·15 | 13·8 |
| Benares | 17 | 27 | 15 | 24·8 | 12·8 | 19·9 | 11·15 | 14·11 | 13·11 | 17·5 | 12 | 15·12 | 12·8 | 14·2 | 11·11 | 14 |

(*continued.*)

| | Feb. 1878. | | March. | | April. | | May. | | June. | | July. | | August. | | September. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. | Wheat. | Barley. |
| Meerut - | 14 | 17 | 16·8 | 23 | 14·12 | 20·8 | 16·8 | 21·8 | 15·8 | 19·8 | 14·8 | 18 | 17 | 21 | 16·12 | 34 |
| Bareilly - | 11·4 | 15·10 | 15·10 | 22·3 | 15·15 | 21·4 | 15·15 | 21·14 | 15·5 | 19·6 | 13·7 | 16·4 | 15·5 | 20 | 15·15 | 21·4 |
| Agra - | 11·8 | 14·8 | 13·8 | 18·8 | 12 | 17·8 | 14·8 | 19 | 14·8 | 17·8 | 14·4 | 18 | 15·4 | 20 | 15·8 | 22·8 |
| Lucknow - | 10·2 | 13·10 | 13·12 | 20·8 | 14·11 | 20·14 | 14·4 | 19·2 | 14 | 17·11 | 12·11 | 15·15 | 13·5 | 16·15 | 14·10 | 21·2 |
| Faizabad - | 10·7 | 12·8 | 13 | 17·2 | 13·4 | 17·12 | 12·12 | 17·4 | 13·4 | 16·12 | 12·6 | 15 | 12·6 | 16·4 | 14 | 21 |
| Gorakhpur. | 11·6 | 14·14 | 13·2 | 17·8 | 13·2 | 17·8 | 10·15 | 14 | 10·15 | 14 | 10·13 | 12·9 | 10·13 | 13·1 | 12·2 | 18 |
| Allahabad | 12 | 14·8 | 12·6 | 16·12 | 13 | 16·2 | 12 | 15·8 | 12·2 | 15·4 | 11·12 | 15 | 11·12 | 15·8 | 13·2 | 19·12 |
| Jhansi - | 11·12 | 12 | 14·2 | 15·14 | 13·8 | 16 | 13·8 | 19 | 13·1 | 15·6 | 12·13 | 15·7 | 14·10 | 17·2 | 17·14 | 22 |
| Benares - | 11·11 | 14·2 | 11·15 | 16·1 | 13·1 | 17·10 | 13·1 | 16·5 | 13·9 | 15·12 | 11·15 | 14·2 | 13·1 | 17·6 | 14·2 | 18·3 |

7. *Debated subjects as to famine administration.*—The subjects which have mainly come under discussion with respect to the famine administration of the North-Western Provinces have been the following:—(1) the policy pursued as to the suspension and remission of revenue; (2) the causes of the unpopularity of the relief-works in the early part of the famine; (3) the causes of the large numbers on the works in the latter portion of the time they were open; (4) the causes of the unpopularity of the poor-houses; (5) the causes of the great mortality.

8. *Orders as to suspension of revenue.*—On the 10th October the Lieutenant-Governor issued a circular on the subject of the collection of the instalments of the land-revenue which would soon fall due as the time for the ripening of the kharif harvest approached. He reminded his officers that the Principle of the settlement was to fix a moderate average demand for a long course of years, in the expectation that the deficiency of a bad year would be made good from the accumulated surplus of coming years. Remission ought, therefore, to be sanctioned only in very special cases, but suspension might be necessary. A general suspension was not called for, as in most districts some part of the crops would be saved. All zemindars who were well off, or whose cultivators had saved a portion of their crops, and generally all who could pay up, should be made to do so, and no indulgence should be shown to those who had failed to help their cultivators. But indulgence should be shown to those who had helped them, and were ready to continue to help them till the next harvest; and suspension must be granted to those who could not pay up without being reduced to such straits as to be unable to cultivate their land for the spring crop. In forwarding a copy of these instructions to the Government of India, Sir George Couper explained his views as follows:—

"If the village communities, who form the great mass of our revenue-payers, be pressed now, they will be simply ruined; whereas, if we allow temporary suspensions, there is every reason to believe that by the end of the agricultural year we shall recover all we forego now from the additional area which the people will be able to bring under cultivation, in consequence of the kharif not having been sown, and the land being therefore available for the spring sowings. . . . His Honour knows that our revenue theory is, that the people should meet the losses of a bad year from the gains of a good one. But, as a matter of fact, these prudential considerations are unknown to them. They never save. When they have a good harvest, they spend the proceeds on marriages and in other ways. . . . Well-to-do zemindars and the owners of tracts in which there has not been a total failure of the autumn harvest will, of course, be made to pay up; but well-to-do landlords are the exception in these provinces, and it is quite certain that the tracts which have escaped the calamity are few and far between."

The Government of India replied (22nd October) that it was understood that, out of 147 lakhs of rupees usually collected in November and December, the Local Government expected to collect 99 lakhs; that the autumn crop had escaped in the greater part of the Benares and Allahabad divisions and the south-east tracts of Oudh, so that the land-revenue ought to be punctually collected there as well as in all irrigated lands even though the zemindars had refused to take canal water which they might have used. Turning to other parts of the country,—

"one crop only, and that not the greatest crop of the country, had failed on unirrigated lands. There is every prospect of a good spring crop over an unusually large area. The failure has come after two or three years of plenty, and years moreover when prices were higher than usual."

In former cases of drought the figures had been as follows:—

| | | | |
|---|---|---|---|
| 1860 | collections in North-Western Provinces, November, December | - | 128 lakhs. |
| 1861 | „ in N. W. P. and Oudh | „ | - 162 „ |
| 1868 | „ „ „ | „ | - 145 „ |

There was, therefore, no precedent for a general suspension of the revenue. The permanently-settled districts of the Benares province ought certainly to pay just as Behar had done in 1874. No doubt, in districts like Agra, where the failure of crops and pasturage had been excessive, or in tracts where single villages are held by cultivating brotherhoods, there would be necessity for partial suspension of revenue.

"But it would be introducing a new principle into the revenue system of the North-Western Provinces, and it would be a direct encouragement to the unthrift described in your fourth paragraph, if the Government were to suspend its demand on any great scale during the present autumn."

The Lieutenant-Governor, in reply to this on the 26th November, pointed out that the loss of the kharif had been far more general than in the case of any previous famine. Even in the eastern districts the crop had not been as good as the Government of India supposed. In Hamirpur it was estimated that only a quarter of the usual area had been sown, and the crop raised on it was about $\frac{1}{4}$ or $\frac{3}{8}$ of an average one: in Jaunpur half the usual area was sown, and the crop on it from one to six sixteenths. Fatehpur was supposed to have a five-anna crop, and Banda a two-anna crop, on half the area usually cultivated. The Benares crop was estimated at a half, and that in Azamgarh and Partabgarh at a quarter and a third of the average respectively, and that on a greatly reduced area. He further pointed out that irrigation in such a season as this had been almost in vain; and that, even if the smaller zemindars could be made to pay up, they could not do it without putting pressure on the cultivators, on whom the burden would ultimately fall. He stated, however, that instructions had been issued to correct mistaken impressions as to the probability of any general or sweeping suspensions being sanctioned, and that officers had been warned that the needs of the State were so urgent, that every effort "must be made to get in a large portion of the land revenue."

9.—*Result of what was done.*—The result of this was that, though little formal suspension was granted, much lenity was shown in collection during the months of November and December, and above 98½ lakhs of rupees were collected, against an ordinary demand of 144 lakhs, so that the province was in arrears about 46 lakhs at the close of 1877. But when the spring crop gave promise of being peculiarly fine, and it was easy for zemindars to raise money on the security of it, the Collectors began to put on pressure for the payment of the revenue; and by the end of the revenue year the arrears were only 12 lakhs of rupees, or 2·9 on the years revenue.

The collections were as follows:—

| | 1876–77. | 1877–78. | Difference. |
|---|---|---|---|
| | Rs. | Rs. | Rs. |
| November to December - | 1,43,74,400 | 98,22,400 | −45,52,000 |
| January to September - | 4,17,80,500 | 4,51,40,200 | +33,59,700 |

The question was much canvassed as to whether greater leniency should have been shown or not, and the Local Government in two letters recorded its opinion and that of several selected officers. The opinions were very conflicting. The conclusion of Government was that, if revenue and rent had been more largely suspended, the zemindars and tenants would have had more money to spend in helping labourers, but that it is very doubtful if they would have done so: they would however have been saved the necessity of borrowing at high rates. The Board of Revenue stated that it was generally agreed that the rate of mortality did not bear any relation to, or in any way depend on, the extent to which suspensions were granted, and that suspensions would only affect the landed classes, not the field-labourers or the non-agriculturists; but the number of registered deeds largely, and the number of proprietary mutations somewhat increased.

10. *Conclusion as to what ought to have been done.*—With regard to the system which should be followed on future occasions, the Famine Commission have recorded their views in Chapter III.; and so far as those views are in favour of a policy more liberal than that pursued by the North-Western Provinces in 1877–78, so far they imply a disapproval of that policy. But this does not necessarily carry with it the corollary that they consider the officers who adopted that policy blameable, or that their is no definite proof that what was done caused any serious injury to the people. The case was one of extreme difficulty; and the anticipations of the rabi crop of 1878 were much more favourable than the event justified. If less pressure had been applied in November and December,—if no collections had been made in January to March till the spring crop

was actually harvested and its character known, and if then as much of the arrears as was possible had been got in, it is probable that as much leniency would have been shown as it was proper to show under the accepted revenue policy of the Province. The result would apparently have been that the arrears at the close of the year would have been somewhat larger, but the zemindars would have been less heavily in debt, and the Government revenue, though delayed, would not have been imperilled.

11. *Reluctance to come to relief-works in first period of famine.*—The next point requiring consideration is the reason why so few people, comparatively, came to the relief-works in the early period of the scarcity. When attention first began to be drawn to the great mortality, it was asserted in some quarters that the cause of it was that the insufficiency of the wage drove the people away from the works; and the Lieutenant-Governor, in a minute written on the 23rd April 1878 to rebut this charge, showed that the wage given, 1½ annas for an adult male, had been sufficient to purchase an ample ration of food, and that the reason why more people did not come to work was an unexplained reluctance. In 1837, he said—

"People beset the house of the European residents in thousands, begging for the food which they had not to give, and for want of which the poor sufferers lay down in numbers and died in their compounds. All former experience has shown that the people are willing enough to come forward themselves when really in want. . . . Nothing of the sort took place this year."

The Government of India in reply admitted that the question was a difficult one, and that the same reluctance to work had been shown elsewhere, and referred the matter for the consideration of the Famine Commission,

12. *Main reason: prospects of the rabi crop.*—The main explanation is no doubt that which is given in the Administration Report of the year[1]:—

"Prices, though high, were not at famine rates, and a certain amount of food was procurable near their homes. The fields yielded a bountiful supply of green vegetable food, with which every year in the cold weather they eke out their existence; and this they consumed in large quantities, finding to their cost that, though hunger was allayed, their strength was not supported.

So, too, Mr. Edwards, Commissioner of Rohilkhand, wrote[2]:—

"The people welcomed the 'sag' and other herbs that sprang up after the October rain, never doubting that, mixed now and then with a little meal, it would support them till the rabi had begun to ripen. . . . As the rabi approached maturity, the hopes of the people rose. The crop was magnificent: it spread over an unusually large area, and afforded so ready a means of relief to the starving that, long before it was ripe, pilfering had become general, and every field had its one or two watchmen prepared to resist to the death all attempts at theft. Many a broken head resulted and not a few lives were sacrificed; but these were nothing to the numbers who died from gorging themselves with the unripe grain."

The gram especially and the mustard plants were unmercifully picked; and this partly explains why the former crop turned out so badly. Distress became more severe when the rain in December stopped the field-work. The numbers did then mount up very very rapidly, though they were far less than could have been accommodated on the works opened, and less than the number who really needed relief. But the people could not believe in starvation with a fine crop ripening before them, and believed they could manage to exist somehow till the harvest came. After it was cut, and as long as the prospects of the kharif were doubtful, there was no such reluctance shown to accept employment on relief-works.

13. *Second reason: harsh management of relief-works.* — Another cause must be mentioned to which weight has to be given. It is impossible to resist the conviction that the relief-works at first were harshly and badly managed. The new or Bombay policy was introduced, and the works were placed under professional supervision, but the policy was not carried out to its full extent, by making the Public Works Department officers understand that the works were for the people, and not the people for the works. The Collector of Muzaffarpur reports[3] that:—

"the ordinary method of executing works is by petty contract; and it was laid down at the commencement that the works were to be carried out strictly in the ordinary manner."

And contractors were not bound to furnish work to all comers, but could select their men, and would not select the weak and emaciated. The same system was adopted in the district relief-works in Etah and Etawah, as well as on the Lower Ganges canal in Mainpuri,[4] and also in the Agra District, and with the same results. In Rohilkhand the Commissioner writes[5] that:—

"work was at first rigorously exacted by Public Works subordinates, who looked solely to the work done and its cost, and seldom troubled themselves about the object with which the works had been started.

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[1] p. XXXI. [2] 6th May 1879, paras 8 and 12. [3] 14th December 1878, paragraph 6.
[4] Commissioner, 8th July 1879, pp. 5 and 6. [5] 6th May 1879, paras. 19, 22.

. . . The work was at first given out in petty contract, and the views of Government defeated; but this was soon discovered and remedied. It was, however, a more difficult task to make the subordinates of the Department Public Works understand the real object of the works and their duty with respect to the labourers. For a time they exacted the same work from the weak and strong—from the bildar and from the man who had never before done a day's earthwork; a Native overseer in the Department Public Works has no more bowels than a hyæna."

This is strongly put, and it might probably be replied that a native overseer in the Public Works Department is like a native in every other department: he follows the cue set him by his superiors, and does not strike out a line of his own. The main cause of this error seems to have been that the Chief Engineer did not warn his subordinates beforehand against the danger of too much severity, and that civil officers were not instructed that they should supervise the management of relief-works (in all but professional details), and that the collector must be in this, as in other respects, the head of the district administration. The one officer who appears to have understood this necessity and to have assumed the responsible position that was properly his, was the collector of Bijnor, Mr. A. Colvin. He had, perhaps unwisely, cut down the wage to an anna per adult male, or 2 annas per 100 cubic feet, thinking that, as in 1861 and 1868, the people would crowd to the works, and that it was necessary to keep off those not absolutely in want. But when he found out the difference in the temper of the population, he raised[1] the rate to 3 annas, and gradually to 6 annas per 100 cubic feet; and having thus tempted the people to come to the works, he then began to reduce it again, and to enforce discipline and order, issuing at the same time orders that all emaciated wanderers on the road should be compulsorily detained and sent to relief-works or poor-houses. Other collectors may have taken similar steps, but it has not been reported; and it is on record that many considered that they had no right to interfere at all with the management of relief-works. So little were the respective duties and powers of the different classes of officers defined, that it is reported that one district engineer refused to receive on his relief-works, and actually turned off persons who were sent in by the civil officers as urgently in need of relief, preferring to endanger their lives rather than lower what he considered to be his own position.

14. *Third reason: hope of relief without work.*—There is also a third cause alleged for the refusal to work, which is said to have been due to a change in the temper of the people, who claimed to be fed for nothing. They are reported to have said:—"In "former famines of less severity Government supported us and required nothing of us; "how is it that in this great famine we are required to work?" It is difficult to see how this idea can have grown up. As far as our records go it is clear that in 1861 and 1868 relief was nowhere given without work; and though no doubt the work done was often inadequate, there was no want of pressure and insistence upon it. Possibly the rumour of the lavishness of relief in Behar in 1874 may have spread over the country, and led the people to expect the repetition of that great blunder. But it seems more likely that these phrases were used only as phrases by men who did not feel sufficiently starved to force them to work. This was Mr. A. Colvin's opinion in Bijnor. He relates how some gangs demanded a wage of 2 annas a day, and no measurements, and on refusal marched off in a body; and how men employed by a Raja at $1\frac{1}{2}$ annas a day insisted on spending every other day in idleness in their villages. "This general wish to be fed "well and do little shows a capriciousness which is not the child of misery."[2]

15. *Reluctance fully explained.*—These considerations lead pretty clearly to the conclusion which should be adopted, and show that the reluctance of the people to come to the relief-works was nothing wonderful. The distress was not very severe, for food was not at famine prices, and even those who had no money with which to buy and no credit to pledge were buoyed up with the hope that they could live off the growing crops and that the ripening of the harvest would put an end to their troubles. The works were managed at first with inconsiderable harshness, and obtained a bad reputation. Employment in the fields was abundant till December, and the numbers on relief-works fell from 32,000 to 17,000. When field labour ceased, they rose rapidly to 73,000 in February, and fell again to 12,000 in April, when the harvest was being reaped. The connection between cause and effect is as close and natural as can well be conceived.

16. *Cause of crowding into works in latter period of famine.*—The next debatable question refers to the sudden rise of the numbers on relief-works in July and August—a rise which has been attributed to the injudiciously high rates of wage imposed by the orders of the Government of India. When the numbers began to rise again in May, the North-Western Provinces Government compiled the instructions which had been

[1] Commissioner's report, 6th May 1879, p. 8.

[2] Commissioner's report, 6th May 1879, p. 8.

issued from time to time into a Famine Code, and sent it to the Government of India, which approved it with some few exceptions. One of these related to the relief wages. The previous orders had been that the rate should be such as to provide a sustenance for all (the sustenance being ten chittacks of wheat flour and two of dal for a man), and should not exceed $1\frac{1}{2}$ annas for a man, 1 anna for a woman, and $\frac{1}{2}$ anna for a child; and this scale was adhered to in the Famine Code. The Government of India, however, preferred the plan, which was followed in Bombay, of fixing two rates—one to be paid to those who performed a higher task, giving a margin above subsistence; and the other a strictly subsistence wage for those who performed a less task; and they also prescribed a minimum below which wages should not be ordinarily cut for short work. The scale was as follows :—

| —— | Special Gangs (emaciated). | Ordinary Gangs doing 75 per cent. of a full Task. | Minimum Wage below which Reduction should not go. |
|---|---|---|---|
| Adult male - - - | 12 chtks. flour + 9 pie | 10 chtks. flour + 9 pie | 10 chtks. flour + 3 pie |
| Woman or big child - - | 10 chtks. flour + 6 pie | 8 chtks. flour + 6 pie | 8 chtks. flour + 3 pie |
| Working child - - | 6 chtks. flour + 3 pie | 4 chtks. flour + 3 pie | 4 chtks. flour + 1 pie |

These rates were introduced into most parts of the North-Western Provinces and Oudh between the 20th and 31st of July, and continued in force till the last week of August, when they were withdrawn on the representation of the Local Government, that they were universally thought to be too high, and that as rain had fallen plentifully and employment was abundant in the fields, and the prospects of the kharif were good, the time had come for making preparations to close relief. The question of the working of these rates of wage has been separately discussed in a note appended to this sketch; and it has been shown that in the case of the thirteen works for which statistics were obtained, in only two was there any coincidence between the rise in numbers and the enhanced rates. In one case the enhanced rates were not given; in three, rates higher than the prescribed ones were given; in four cases the numbers fell in spite of the enhanced rates; and in three more the wage actually paid, owing to fines for short work, were less than had been paid before. Looking at the figures for the whole province,[1] it is evident that there was no very great increase in the numbers, and what there was was largely due to the opening of new works. The "Mat canal" work in the Agra district, which was begun in August, alone employed 15,000 people daily during that month, and more than accounts for the entire increase.

17. *Relaxation of task work.*—From papers received since the appended note was written, it appears that the fixing of a minimum rate was generally misunderstood. The object of that rule was to prevent persons who failed through weakness to perform their allotted task from being paid proportionately to the amount they had done, and so having their wage reduced below the minimum necessary to support life. The impression seems, however, to have got abroad that the intention was to discourage tasking altogether. Thus the Commissioner of Rai Bareli, Mr. Lane, wrote[2] that these orders—

"seem to have done away in a great measure with the value of any test. When all comers were admitted, and men could get enough to live on by doing the smallest amount of work, it was not to be expected that they would exert themselves much to get the slight increase allowed by the maximum rate. . . . Are men to be supported who can work and won't? If they are to be paid a bare subsistence wage, how is some return in the shape of work to be got from them?"

So, too, the Commissioner of Lucknow, Colonel Reid :—

"Even among the lower castes there was never anything like a rush to the works, except during the brief period when, injudiciously as we all thought, the task test was held in abeyance."

It is sufficient, perhaps, to point to the example of Bombay, where the principle of a minimum rate was adhered to, but the task test was not held in abeyance, and on the contrary better work was obtained than ever was got before from famine coolies. Task-work, in which there is a maximum rate but no minimum, would be piece-work with all its evils and none of its advantages. It is essential to fix a minimum rate, for otherwise those who are feeble would be slowly starved because of their feebleness; but reliance should be placed on active supervision and pressure in compelling them to do their best, and on the stimulus of a higher wage held out as a reward for those who do a larger

[1] June, 104, 599. July, 119,918. August 126,824.

[2] 14th March 1879.

task. No doubt this misconception had something to do with the increase of numbers in some districts; but, on the whole, it must be pronounced that there was no such increase as to cause alarm, or to necessitate especial enquiry into its cause. As soon as the rain began to fall steadily, the numbers decreased rapidly, and the people hastened back to more congenial employment in their fields.

18. *Causes of unpopularity of poor houses.*—The poor-houses were managed in all cases on the principles laid down first in Moradabad in 1861, and adopted afterwards in 1868 and 1874. Cooked food was given to all applicants on the condition of residence within the enclosure. The numbers were never large, the maximum being 26,000 in August. After the scarcity was over, reports were received from many quarters of thier extreme unpopularity. Three officers in particular confirmed this, who were specially deputed to enquire into the causes of the mortality. Mr. Benett wrote that though it was usually thought a sufficient precaution to provide a Brahmin to cook the food, this was not so. The cook must be known to the people, and known to be a man of good character.

"A tahsildar sent out a messenger to bring in a colony of 14 Ahirs and Lodhs whom he knew to be starving at a village a few miles off. They said they would die rather than lose their caste. And a week later two miserable old men crawled in saying that all the rest had died, and that, being left alone, they had no longer the spirit to resist the food that was so near them."

Mr. Roberts states that loss of caste was occasionally the result of entering the poor-house. Captain Pitcher writes:—

"Everywhere I found in the village the practice of excommunication from caste resorted to by all castes except two (Chamars and Sweepers) against those people who went to the poor-houses. Poor-houses will never be more popular than they are now, until Chamars and Bhangis are relegated to separate enclosures."

These reports are entirely opposed to the opinion which has hitherto been current, that the conditions of residence in a poor-house, and of cooked food, are tests severe indeed, but not too severe for the purpose of keeping away unworthy applicants. Colonel Baird Smith reported in 1861 that the system was highly approved by all the native members of relief committees. No objection to it was raised in 1868, or in 1874. It has been the deliberate conviction of the most experienced officers in the North-Western Provinces, that though cooked food is disliked, everyone who is starving or in the extremity of hunger would overcome that dislike and would accept it if offered him. Were those officers mistaken, or have the present reporters been misled by exaggeration, or has a change come over the feelings of the people, or was there any difference in the system of management of the poor-houses?

19. *Attempt at explanation.*—These questions do not, I believe, admit of any very definite replies, but to some extent a certain amount of light can be thrown on them. In the first place, there is no doubt that the extent of the mortality in previous famines was concealed from us, as it would still be but for the registers of deaths; also we know more of the process of chronic starvation, and are aware that in all severe famines many people will stop at home, in a vague hope of the impossible, till they are too weakened to apply for, or to be saved by relief, however liberal and unburdened with conditions. Acute starvation at a particular stage will probably drive a man to accept any food offered him, but chronic starvation leads often to apathetic resignation, or causes diseases for which there is no remedy. So far then it is not true to say that no one will die rather than go to a poor-house. Many will put off going there till it is too late. On the other hand it seems possible that the stories told after the scarcity was over would have been told after the close of previous famines, had similar opportunities been given. In other parts of India it has been observed that the very people who crowded to the relief-centres expressed the utmost horror of them afterwards, and denied having gone there. Captain Pitcher's most strenuous deponents were in the Bareli district, of which the Commissioner reports that the people flocked to the poor-house, though they refused to have anything to say to the relief works, and they had to be turned out and sent to work by force. Thirdly, as to the caste question, there is no evidence whether people were or were not put out of caste before. No special enquiry, as far as is known, was ever made on the subject; but the Hon. Sayyad Ahmed states that he never heard of its happening, and if that is the case it shows that some change of feeling has passed over the minds of the people at large in respect of this mode of relief. It must not be supposed, however, that the fact of being put out of caste is a very terrible thing among the lower classes; it merely implies a small expenditure and a dinner. But it is worth considering whether on future occasions native public opinion could not be influenced through its leaders in such a way as to make people feel that it is base and cruel to punish socially those who are

compelled by want to accept food in this way. After the Orissa famine the Pundits of Calcutta and Cuttack issued notices declaring that paupers who had partaken of government cooked food under the pressure of hunger had committed no fault, and that it would be a sin to put them out of caste. Lastly, the management of the poor-houses seems to have been in all respects the same as in previous years. Sayyad Ahmad states (*vide* his memorandum), that he has heard of mismanagement, but perfect management of such institutions can hardly have been attained in former years; and there is much evidence as to the great care that was bestowed on them in many places. Mr. Edwards writes of the Bareli Poor-house which accommodated 5,000 paupers :—

"No pains were spared in making it what it should be. Separate blocks were allotted to Thakurs, Muhammadans, Chamars, &c., and every care taken to avoid interference with caste prejudices."

Drs. Townsend and Planck, who were deputed on a special tour to examine these establishments, reported decidedly in favour of the way they were managed, though, as was natural, they found some faults to correct.

"The Poor-houses, as a rule, were well looked after. At Agra, Rai Bareli, and Basti, the arrangements were excellent. At Lucknow and Bareilly the accommodation was insufficient, and there was great overcrowding. At Muttra the inmates were well looked after; but the mistake had been made of occupying several separate buildings in different ports of the town, instead of collecting the paupers in a garden or tope outside. At Muttra also, through fear of expense, the kind of food was not suitable for people greatly reduced and debilitated. In other places it was invariably good and well cooked. The distribution of the food was also carefully supervised, and nowhere had we reason to suspect that the inmates did not receive the full ration prescribed. The ration usually given consisted of eight chittacks of wheat atta, and 1½ of dal to adults, with salt and condiments; and, so far as I was able to judge by inspection of the inmates, this ration was sufficient for subsistence, and the weakly and emaciated (provided diarrhœa had not come on) recovered flesh and strength under it. In this opinion the medical officers generally agreed; and both at Agra and at Basti numbers had so far recovered under this ration as to be considered fit for transfer to the work."

It is possible, however, that on future occasions some use might be made of Mr. Benett's suggestion for administering relief of this kind exclusively through native agency, so as to avoid the prejudices aroused by a poor-house managed by Europeans.

20. *Extent and nature of the mortality.*—With regard to mortality, I can hardly do better than refer to the notes on the mortuary statistics, and on the special inquiry into the causes of mortality, which are appended to this sketch. The facts may briefly be summed up thus. In the fourteen months, November 1877 to December 1878, the deaths registered were 1,721,652 against an average number (at 20·2 per mille of 990,747, giving an excess of 730,905; and if it be accepted that the actual usual number of deaths in ordinary years is about 35 per mille (of which only 20·2 are registered), and that the same deficiency went on in 1877–78, then the real ordinary number in fourteen months would be 1,716,640, and the actual number of deaths between November 1877 and December 1878 was 2,983,060, or an excess number of 1,266,420. Of the usual causes of death, cholera alone was less active than usual. Small-pox and fever were most virulent and fatal, and a great number of deaths were attributed to bowel-complaints. The special inquiry brought out the following as its most important results :—

"That the effect of relief-works, where they were large and numerously attended, is traceable, though not very clearly, in a diminished mortality; that in one tahsil in Oudh where the landowners behaved with remarkable liberality, their exertions, coupled with the Government relief measures, went a long way to enable the people to resist the losses by drought; . . . that the classes who suffered most were the field-labourers and rural artisans—after them the town artisans; while the cultivators escaped with little, and the landlords with no, loss of life."

21. *Suggested summing up as to North-Western Provinces famine administration.*—The question how far mortality is preventible in any great famine has been discussed in my sketch of the Bombay famine of 1876–77, and my views need not be repeated here. But, as far as regards the North-Western Provinces, the Government of India have called on the Famine Commission to pronounce an opinion regarding the administration of relief in the North-Western Provinces, and whether to any defects therein the great mortality of 1878 is attributable. I submit, for the consideration of the president and members the conclusions to which I am led by an examination of such imperfect data as, in the absence of any provincial report we have before us. It seems to me that the principles on which relief was administered were perfectly sound and correct, but that there were a few errors and omissions in details which it may be well to point out for future guidance, though not with the intention of conveying censure, since all plans and arrangements are liable to correction in the light of the fuller knowledge of later events. The relief works were sagaciously planned, were sufficient in number, were opened in

due time, and were wisely put under professional supervision. But the relations between the Civil and Public Works Department officers were not clearly enough defined; the paramount authority of the collector was not laid down; enough care was not taken to instruct the subordinates as to the temper in which they should act, and the manner of carrying on relief works; and sufficient activity was not shown in supervising the works to see that orders were properly obeyed. The chief engineer, who was in charge of all relief operations, should also have had authority over poor houses, so as to see how the respective numbers fluctuated, and a system of weekly returns should have been initiated from the first for the same purpose. The belief that the government had to deal with a scarcity, not with a famine, was a correct one; and it was right to discourage panic and to restrict relief to those absolutely in want. But if collectors and commissioners had been more alive to the duty of seeing that what was being done was done well, it is probable that most of the irregularities in detail which were detected by Drs. Townsend and Planck, and again by Mr. Cunningham, would not have occurred. It is doubtful whether, even under a perfect system, a larger amount of relief could have been given in November, December, January, and February than was given, while that given in June, July, and August was, if anything, larger than necessary, not less, and was partly due to an unfortunate misunderstanding with the Government of India. The Local Government cannot therefore be held in any way chargeable with the mortality that occurred, since it is held that no relief that could have been administered on any sound and reasonable system (apart from errors in detail which have been noticed) could have availed to prevent it.

22. *Attempt to estimate the loss by Famine.*—It was observed in para. 4 that the data for making a complete detailed estimate of the loss of the kharif crop hardly exist; and yet it seems desirable to make such an approximation as is possible, considering how essential it is, in order to estimate the resisting power of the people, to calculate the extent of the strain they had to bear. According to the paper on agricultural statistics, the ordinary production of the province in an average kharif harvest is as follows :—

| Crop. | Acres. | Outturn in maunds. |
|---|---|---|
| Jowar | 4,976,500 | 36,278,600 |
| Bajra | 3,364,000 | 21,361,400 |
| Rice | 2,505,000 | 28,035,000 |
| Macai | 846,000 | 9,585,000 |
| Small millets | 819,000 | 5,733,000 |
| Pulses | 1,000,000 | 7,000,000 |
| Arhar with cotton | — | 6,938,000 |
| Total | 13,510,000 | 1,14,931,000 |

Now the indications reported as to the produce of the crop in 1877 (in paras. 4 and 8) may be summed up thus. In the Meerut and Agra divisions hardly any kharif had been saved except in irrigated lands, and of that but little was sown with food-grains; in Rohilkhand, Sitapur, Lucknow and Jhansi divisions, and in the Bundelkhand districts of Allababad, and in Rai Bareli the failure was almost total; it will probably be safe to put the outturn in these parts down as one-eighth of an average crop. In the rest of the Allahabad, Benares, Rai Bareli and Fyzabad divisions the loss was less tremendous, but it was very heavy; and these districts contain about one-third of the total cultivated area of the province: in Azimgarh, Gorakhpur and Basti the rice was entirely lost, and the rest of the kharif was a quarter crop, in Jaunpur it was reckoned to be hardly more than an eighth of an average; in Benares about a quarter, in Pertabgarh about a sixth, altogether it can hardly be reckoned more than a quarter of the usual outturn. If then the harvest amounted to one-eighth in two-thirds of the province, and one-fourth in one-third, it amounted to one-sixth of an average over the whole province; the outturn was therefore 19,155,000 maunds, and the loss was 95,776,000 maunds, or 3,420,000 tons, which at Rs. 50 per ton amounts to 171 millions of rupees or 17 millions sterling.

## The Madras Famine.—1876–1878.

Authorities [Review of the Madras Famine; Note on the Temple Wage; Resolution of the Government of India, June 1882. Moral and Material Progress Reports, 1876–77, 1877–78.]

### *Brief History of the Famine.*

The troubles in Madras dated as far back as the summer of 1875. The Presidency depends for its harvests on the south-west monsoon in summer, and on the north-east monsoon in autumn. In 1873 and 1874, the seasons were good, and, though unfavourable reports came in from 11 districts during the summer of 1875, prices generally kept low and steady. In Bellary, however, the south-west monsoon was an entire failure, and relief-works on a small scale were authorised as early as October. With 1876 the reports became more ominous. They attracted the attention of the Government of India, and the Government of Madras called for more detailed information.

As the summer months went on, it became clear that the south-west monsoon had again failed over the Dekkan plateau, and severe distress showed itself in the districts of that region. The numbers on the relief-works increased, and prices rose with alarming rapidity. By October 50,000 people were engaged on relief-works in Bellary alone, and over Rs. 3.00.000 had been spent generally on wages before the close of that month. Coarse rice was selling at 7 and 8 seers per rupee, and ragi at between 8 and 10. Moreover, when the time came round, the autumnal proved as scanty as the summer rains. In Nellore the rainfall was less than 2 inches against an average of 21; in Chingleput it was about 4 against 24; in Trichinopoly 3 against 14. The foodstocks in the country were unusually low, and the cattle died off for want of fodder, and fever began to make its appearance. Things grew steadily worse from the autumn to the end of the year, by which time at least a million labourers were on the relief-works, and prices had risen still further. Gratuitous relief had also began on a large scale. The earliest months in 1877 were marked by an intensity of the sun's heat, which completely burnt up the already parched country. The distress reached its maximum, and the number relieved either on the works or gratuitously, touched its highest point. As summer advanced prices declined a little, but the south-west monsoon, though it did not entirely fail, was short and fitful. Towards autumn the outlook became more desperate than ever, in view of the possibility of the north-east monsoon again proving deficient. The Viceroy visited Madras to confer with the Governor on the necessity of a larger scheme of relief-works; but scarcely had this been organized when a copious north-east monsoon, accompanied with violent storms and floods, removed the worst apprehensions. At the end of November the number of persons in receipt of State relief had fallen to 675,000, and at the end of December to 470,000.

Prices, however, were high and fluctuating throughout the earlier part of 1878, and this circumstance produced a recrudescence of distress in certain districts. Up till July there were still 200,000 persons on the hands of the State; but the summer and autumn rains were abundant and well-distributed, and prices settled down gradually. The number of applicants for relief decreased in proportion, and by December of that year the Government felt justified in closing all relief-works.

### *Area and Population of Famine Tract.*

The Madras Presidency is divided into 21 districts; 14 of these were affected more or less by the famine, forming an area of 83,000 square miles, with a population computed roughly at 19 million. In only seven[1] of these, however, was the famine really severe for an extended time. With the exception of the sea-board districts of Nellore and Chingleput, all these are grouped together in the centre of the Presidency to the east of the Ghâts. Taken together their total area came to 52,862 square miles, with a population of 10,024,104 at the census of 1871. In Bellary, Kurnool, and Cuddapah, the usual difficulties were enhanced by the proximity of the districts to the Nizam's territory, and the consequent immigration. Chingleput and Nellore were fortunately accessible by sea, and received supplies of grain in this way. The other group of districts is traversed by the Madras Railway, which connects them on the north with the Great Indian Peninsula line, and in the south with Madras port. Another branch of the line runs south-west from Madras to the Malabar coast, through Salem and Coimbatore. The main line of communication with the inland districts was therefore tolerably complete, although the carrying power of the railway at times proved inade-

[1] Bellary, Kurnoul, Nellore, Cuddapah, Chingleput, Salem, Coimbatore.

quate, and the subsidiary roads and wheeled carriage were often defective. The northern districts of the Presidency entirely escaped the drought. In the extreme south the failure of the north-east monsoon of 1876, brought Madura, and, to a less extent, Tinnevelly, into the list of famine districts, and, towards the close of 1877, the high price of food and the number on relief-works in the former district, indicated severe distress. Large stocks of grain were thrown into it from Tanjore and Negapatam by the South Indian Railway, which thus played a very important part in the scheme of relief. Between August 1876 and December 1878, the Madras Railway carried nearly 1,000,000 tons of grain, and the South Indian Railway nearly 400,000 tons, into the distressed districts.

### *Action of Madras Government.*

The attitude of the Madras Government in the early months of 1876 was one rather of vigilance than decision. The first relief works on a small scale had been sanctioned for Bellary in the previous August. With the Spring of 1876, provisional relief-works, also on a small scale, were sanctioned for Cuddapah, Tinnevelly, Chingleput, and South Arcot. By August the real character of the distress had become apparent, together with the inadequacy of the provincial funds. An application was consequently despatched to the Government of India for assistance from the Imperial funds, and also a proposal to start relief-works on an extensive scale, in order to concentrate the scattered labour. The particular undertaking suggested was the embankment of the Bellary-Guddak railway. Pending the reply, the Madras Government found itself confronted with a threatened insufficiency of the food supply. In October arrangements were made for forming a grain reserve, and Messrs. Arbuthnot were instructed to hold 30,000 tons of grain for Government. Further operations in the same direction were in contemplation, but were disapproved after a correspondence with the Government of India, as calculated to interfere with private enterprize, which appears to have been extraordinarily active. Towards the end of the same month the expected reply to their proposals was received by the Madras Government. Looking to the critical state of the finances, and the possibility of the situation improving, the Government of India declined to sanction large and expensive relief-works, and recommended the prosecution of local relief-works. To the organization of these attention was therefore directed. Accordingly, at the end of 1876, there was a large scattered system of petty relief-works, employing about a million labourers.

These, again, were found to be very inefficiently supervised. Orders were, in consequence, issued at the beginning of the next year, placing the subordinates of the Public Works Department at the disposal of the civil officers to supervise works, and directing the executive engineers to assist them. No action was, however, taken to give effect to these orders till the end of April.

### *Deputation of Sir Richard Temple.*

In the beginning of 1877, the full gravity of the situation impressed itself upon the Government of India, and Sir Richard Temple, as an officer acquainted with their views, was deputed on a special mission to visit the residencies of Madras and Bombay, and to communicate personally with the two Governments on the subject of Famine Relief He arrived in Madras on the 14th January, and left on April 24th, during which time he submitted a number of minutes and memoranda to the Madras Government, many of which were acted upon. The first thing that engaged his attention was the overcrowding on to the relief-works. Applicants for relief were thereupon subjected to a more stringent examination. Following on this, a stricter system of village inspection was established. The existing rate of wages was also reduced, and money wages were generally substituted for payment in grain wherever this prevailed, the rate being adjusted according to the price of food. Extensive public works were opened for the employment of large numbers of able-bodied labourers under professional superintendence, and arrangements were made for bringing gangs on to them from distant localities. Moreover, in addition to the strict scrutiny of applicants for relief-work, the population already occupied on it was examined, and any persons who showed no real sign of want were at once excluded. Various causes prevented these measures being carried out with full success; but their effect was immediately visible in the diminished numbers on the works.

### *The Temple Wage.*

The previous wage paid on the relief works, 1½ lb. of grain and 3 pies for an adult, was reduced in January, at the strong recommendation of Sir R. Temple. The allowance was fixed at 1 lb. of grain and ½ an anna for an adult under ordinary circumstances, the ½ anna being raised to an anna when the works were under the Public Works Department. It will not be necessary to give the arguments in favour of either rate of wages, as they are discussed in a separate note on the effect of the Temple wage in Madras or Bombay in this volume. Only the history of the different changes in the rate will therefore be sufficient. On the 1st March the Sanitary Commissioner of the Presidency, Dr. Cornish, officially protested against the reduced grain ration, as insufficient to keep the people in health. A conference was held, at which Sir R. Temple was present, and though the Government determined to give the lower rate a further trial, some slight modifications were introduced. The reduced scale, however, appeared to tell heavily on persons already weakened by long privation, and in May the Government so far reverted to the old scale as to increase the ½ anna to 1 anna per diem on all relief-works where the tasks were not less than 50 per cent. of a nominal day's work.

### *Gratuitous Relief.*

The beginning of 1877 brought the Government face to face with another difficulty, the enormous increase of gratuitous relief. This was largely occasioned by the summary reductions of numbers on the relief works, which in many cases simply transferred people to gratuitous relief, and also by the lower scale of wage. In January 80,000 persons were being gratuitously relieved. Two months after the introduction of the new wage the numbers had risen to 300,000, and in June they reached 491,949. Meanwhile the labourers on the relief-works fell off between January and April from 900,000 to 674,000. In administering gratuitous relief, those who were unable to work were at first collected in closed relief camps, where cooked food was given out. But eventually Government considered that this system fostered much unnecessary and aimless wandering, besides being opposed to the instincts of the people. Accordingly district officers were allowed in May to grant relief to the destitute in their own villages, instead of removing them to a relief camp, and a money dole given through the village headman was substituted for the cooked food. There was a hesitation in preferring village relief to central poor camps in Madras, because it was feared that the Government had not sufficiently strong inspecting agencies at command to prevent such relief being gratuitously obtained by many who ought to have been subjected to a labour task. This apprehension found expression in a minute by the Viceroy on the 12th August: "It is "the inevitable tendency of all gratuitous relief afforded by the State, if it be not super-"vised and restricted with the most scrupulous exactitude, to intrude injuriously on "the field of labour relief, and thus demoralise large masses of the population." At that time the average daily number of persons gratuitously relieved in the Madras Presidency was 1,131,000, of whom nearly half were the subjects of village relief, and the other half were resident in relief camps. The number of labourers on the relief works in August 1877 was 919,912, of whom only one-fifth were employed on large works under professional agency; and the monthly expenditure on famine relief of every kind had risen to the immense sum of 49 lakhs.

### *System of Relief re-organised, August* 1877.

In August 1877 the south-west monsoon again failed, and the aspect of affairs became so menacing that the Viceroy undertook a journey to Madras to confer with the Governor. Before leaving he elaborately reviewed the situation in the minute quoted above. The chief points dwelt on were the defective carrying power of the railways, the inutility of the works on which the majority of the relief labourers were employed, the enormous numbers in receipt of gratuitous relief, the necessity for a large scheme of public works of lasting utility, and the intention of the supreme Government to place at the disposal of the Local Government the engineering and supervising staff required for this purpose. Again the cumbrousness of the existing administrative machinery was insisted upon, and it was determined to concentrate the whole famine administration in the hands of the Governor himself, assisted by a high officer, General Kennedy, in the confidence of the Supreme Government. Relief works on a large scale, and mostly under personal supervision, were made the backbone of the system; village relief was confined to the old and

house ridden, who were clearly incapable of labour. Relief camps were also retained, but on the understanding that the inmates, if they regained strength, would be transferred to work of a light nature under civil management, and thence to the larger operations under the Public Works Department. But the system of relief had scarcely been re-organised on this sound and economical basis when the rains of the north-east monsoon fell abundantly and dispelled the most serious apprehensions. By the end of November the number in receipt of relief fell to 675,000, by the end of December it had fallen below 500,000.

### *Famine Expenditure.*

The total net expenditure incurred from the beginning of the famine till March 1880, amounted to 630 lakhs, allowing a credit of 30 lakhs for excess railway receipts, and of $26\frac{2}{3}$ lakhs for grain recoveries. The heaviest expenditure fell in 1877–78, the figures for that year being more than 440 lakhs.

To this must be added the loss of revenue which is estimated at over 191 lakhs. The total loss therefore entailed by the Madras famine cannot be put down at less than $8\frac{1}{4}$ millions sterling. Three and a half millions of this were spent upon relief works which might have been productive. But the value of the work done, if estimated at the normal rates, was not more than one and a half millions. The reason for this result is to be found in the great number of petty works which were started, and to the inefficient supervising agency at the command of the Government until the latest stages of the famine were reached. Among the important works undertaken, the earth-works of the Bellary Hubli Railway, and the Buckingham Navigation Canal are conspicuous. Some large tanks were also excavated and repaired. The annual expenditure during the three famine years on relief works and on charitable relief is here contrasted.

| —— | 1876–77. | 1877–78. | 1878–79. |
|---|---|---|---|
| | Rs. | Rs. | Rs. |
| Charitable Relief - - | 11.01.936 | 159.21.953 | 8.27.847 |
| Relief Works - - | 94.94.369 | 230.54.463 | — |

(Madras Famine Review, Appendix P.)

### *Money Advances.*

A satisfactory feature of the Famine Administration is to be found in the money advances made to the distressed population. Rs. 3.80.900 was advanced for the purchase of seed grain and Rs. 14.19,000 for the construction of wells and tanks under the Land Improvement Act. Of these 18 lakhs, less than one lakh is considered to be entirely irrecoverable. The policy of employing artizans, when applicants for relief in their own occupation, which, under certain conditions, has found a place among the recommendations of the Famine Commission, was also adopted. Twelve lakhs were advanced to the weavers, and were nominally recovered in the shape of cloth woven by them. A considerable stock however was left unsold, on which a certain loss must be incurred. But there is no reason for supposing that the labour of this population, had it been employed on the ordinary relief-works, would have proved more profitable.

### *Loss of Land Revenue.*

The problem of estimating the loss of land revenue assignable to the famine is made very difficult in Madras, where the ryotwari system obtains. The ryot being at liberty to resign the whole or any part of his holding, the occupied area and the revenue on it necessarily functuate from year to year.

Again, the demand, when settled, is liable to reductions on account of remission of revenue made under the ordinary rules, and finally the reduced demand may not be realised in full, and the balances have to be struck off. But, keeping these considerations in mind, the following table will yet furnish a general illustration of the effect produced by the famine on the area held under the ryotwari settlement.

| Year. | Occupied Area. | Percentage cultivated. | Land Revenue Remitted. | Net Demand. | Collections. |
|---|---|---|---|---|---|
| | Acres. | | Rs. | Rs. | Rs. |
| 1875–76 - - | 20,021 | 87 | 38,94,609 | 3,46,12,214 | 3,17,09,251 |
| 1876–77 - - | 19,956 | 71 | 1,07,72,439 | 2,72,90,801 | 1,81,35,936 |
| 1877–78 - - | 20,009 | 78 | 38,88,867 | 3,50,68,670 | 2,40,67,242 |
| 1878–79 - - | 19,904 | 79 | 29,41,278 | 3,61,67,558 | 2,94,11,186 |
| 1879–80 - - | 19,171 | 81 | 31,43,694 | 3,54,57,141 | 3,04,37,387 |

It will be seen from these figures, first of all, that the occupied area did not shrink to any great extent on account of the drought. The people clung to their holdings, and the area leased to ryots in 1877–78 was practically as large as in 1875–76. The drought, however, affected cultivations severely. In the year before the famine, 87 per cent. of the occupied area was under cultivation. In 1876–77 the proportion had fallen as low as 71 per cent., or in other words very nearly $3\frac{1}{2}$ millions of acres had gone out of cultivation. Naturally the amount of remissions corresponded to this, and in the same year 107 lakhs of land revenue were struck off the gross demand, while the actual collections showed a proportional decline. In 1877–78 remissions were granted much less readily, and the net demand for the last three years taken has been up to the average of normal years. The actual collections, however, have not experienced a similar recovery.

The revenue charges of the permanently settled and other estates are more easily dealt with, because in normal years the revenue is less subject to fluctuations. The net demand on the whole land revenue of the Presidency, after the usual remissions have been made, averages 450 lakhs. In 1876–77 the net demand fell to 365 lakhs, or 85 below the usual amount. The year ended with an outstanding balance of 140 lakhs, of which over three were afterwards remitted. In 1877–78, the demand rose to 447 lakhs, of which 313 were collected, and the outstanding balances came to 183 lakhs in all. In 1878–79 the current demand was 461 lakhs, and 370 were collected. But $134\frac{1}{2}$ lakhs were also realised on account of the outstanding arrears, and $1\frac{1}{2}$ were remitted. In 1878–79 the year began with outstanding balances estimated at 138 lakhs, and the current demand was fixed at 454 lakhs. By March 1881, all except $24\frac{1}{2}$ lakhs had been collected of the current demand; 99 lakhs of arrears had been got in, and three were remitted. The total balances outstanding at that time aggregated $60\frac{1}{2}$ lakhs, of which 36 were due to arrears between 1876–79. The Madras Government then wrote off $11\frac{1}{2}$ lakhs of this standing balance, and finally the remaining $24\frac{1}{2}$ were remitted under the orders of the Secretary of State for India in Council.

To sum up, including the diminished land revenue of 1876–77 and succeeding years, the arrears written off at different times, and the large remission ordered by the Secretary of State, the total loss of land revenue due to the famine and the consequent impoverishment of the people, cannot be set down at less than 150 lakhs or $1\frac{1}{2}$ million sterling. In addition to this there is the decrease experienced in the excise, salt, and miscellaneous revenue. Thrown together, the various items bring up the total loss of revenue to a round sum of 191 lakhs.

### *Difficulty of Collections.*

The land revenue, moreover, was not collected during the famine years without recourse to coercion. The large increase in the number of forced sales and other severe processes, and the decreasing area under occupation in Salem and other districts, point to the difficulty the Madras ryot encountered in satisfying the demands of the State. These questions eventually formed the subject of correspondence between the Government of India and the Secretary of State.

It will not, however, be necessary to advert to it in this history, further than to record that the Government of India finally expressed a conviction[1] that a more certain and self-working method of relief should in future be introduced into the revenue system of the Presidency, which should minimize the risk of aggravating the distress of the agricultural population by harsh measures of collection.

[1] Resolution of the Government of India, § 19.

*Mortality.*

The mortality caused by the famine is a complicated and difficult problem. There are three sets of data on which calculations may be founded. A comparison of the population, according to the census of 1871, in six distressed districts, with the population given by the test census carried out in 1878, a comparison of the population in 1871 with the numbers given by applying the test census to the entire area affected by famine, and, finally, a comparison of the census results of 1871 and 1881. Into all these enters the question of the average annual increment of the population, which has been variously estimated, and several minor considerations.

Taking the first set of data, the test census of 1878 comprised the whole of the Salem District, one taluk in each of six very distressed districts, one taluk in each of three slightly distressed districts, and one in Tanjore, where the crops had been saved by irrigation. In Salem the population was returned at 1,599,896 against 1,969,995 in 1871, thus giving a decrease of 107,099.

The population of the six talaks of the west districts had similarly decreased from 871,061 to 739,989, while that of the four remaining taluks showed an increase ranging from 6 to 9 per cent. The total apparent loss in Salem and the six distressed districts amounted to 538,161. But this takes no account of the doubtful rate of increase. The Madras Government at first assumed it to be $1\frac{1}{2}$ per cent. per annum. The accuracy of the computation was immediately challenged by General Kennedy, who contended that there was no evidence to bear it out. General Kennedy's arguments, however, were vitiated by his assertion that the limits of cultivation had been reached in Madras in 1871, the steady yearly increase in that year and in the fifteen previous years notwithstanding. He also laid great stress on the loss of population due to migration. But the emigrants appear to have been generally attracted home by the large donations of the Mansion House Fund for rebuilding and re-cultivating purposes. Nevertheless, the rate of $1\frac{1}{2}$ per cent. seems too high. But if it is accepted, then the total loss in Salem and the six distressed districts would have been three-quarters of a million instead of 538,161.

Secondly, in a Memorandum of 20th June 1878, the Sanitary Commissioner of Madras, Dr. Cornish, applied the results of the test census to the whole famine area, taking a lower annual increment of 1 per cent. Proceeding by this method, which was necessarily conjectural to some extent, he estimated the whole loss to the Presidency at not less than three million lives.

Finally, the results obtained by the decennial census of 1871 and 1881 may be compared. In 1871 the population was returned at 31,597,872. In 1881 it was 30,389,181, and it must be remembered that every successive census improves in accuracy, and comprehends sections of society not before enumerated. There is reason to suppose that this was peculiarly the case with the Madras census of 1881. The decrease in the ten years was three-quarters of a million, while in the period between 1851 and 1871 the census returns show an advance from 22 to $31\frac{1}{2}$ millions. Nor, of course, does the simple decrease at all represent the actual loss, as there is little doubt that the normal rate of increase, whatever it was, would have been maintained during the decade.

District returns abundantly confirm this conclusion. In the following two statements the change in the population between 1871 and 1881 is given (A.) in seven districts that totally escaped the famine; (B.) in the ten districts on which the calamity fell heaviest.

STATEMENT A.

| District. | Population in | | Increase in 1881. |
|---|---|---|---|
| | 1871. | 1881. | |
| Ganjem - - - | 1,520,088 | 1,548,696 | 28,608 |
| Vizegapatam - - | 2,159,199 | 2,363,277 | 204,078 |
| Godavery - - - | 1,592,939 | 1,792,866 | 199,927 |
| Kistna - - - | 1,452,374 | 1,548,507 | 96,133 |
| Tanjore - - - | 1,973,731 | 2,140,585 | 166,854 |
| South Canara - - | 918,362 | 959,020 | 40,658 |
| Malabar - - - | 2,261,256 | 2,333,853 | 72,602 |

STATEMENT B.

| | Population in | | Decrease or Increase. |
|---|---|---|---|
| | 1871. | 1881. | |
| Nellore - - - - | 1,376,811 | 1,220,335 | —156,476 |
| Cuddapah - - - | 1,351,194 | 1,120,118 | —231,036 |
| Bellary - - - | 1,668,006 | 1,339,763 | —328,243 |
| Kurnool - - - | 959,646 | 711,557 | —248,083 |
| Chingleput - - - | 938,184 | 985,554 | + 47,370 |
| N. Arcot - - - | 2,015,278 | 1,817,561 | —197,717 |
| Salem - - - - | 1,966,995 | 1,599,425 | —367,570 |
| Coimbatore - - | 1,763,274 | 1,658,567 | —104,707 |
| Madura - - - | 2,266,615 | 2,167,381 | — 99,237 |
| Madras Town - - | 397,552 | 409,117 | + 8,565 |

In only two of the 10 districts, Madras and Chingleput, has population increased at all. It has fallen off in all the others. Bellary, Salem, Kurnool, where the distress was most intense, show the heaviest loss. In 1871 the population of these three districts was over $4\frac{1}{2}$ millions; in 1881 in barely exceeded $3\frac{1}{2}$. In Salem, moreover, the cultivated area has decreased by one-quarter since 1875, and the district officers attribute this decrease to the mortality among population and cattle in the famine period.

The corrected estimate in the Madras Census Report of 1881 puts the total loss of population even beyond Dr. Cornish's more conjectural computation after the test Census, while assuming a lower annual increment. Taking this at 0·795 per cent. for the $9\frac{1}{4}$ years after the 1871 Census, but allowing for an estimated deficiency in the previous returns of females and floating population, and for the loss by balance of emigration and immigration, there appear to have been $3\frac{1}{2}$ millions of people missing in 1881.

# NOTE ON THE PRACTICAL EFFECTS OF THE REDUCED OR TEMPLE WAGE IN MADRAS, AND OF THE CORRESPONDING RATE IN BOMBAY.

## Section I.—Madras.

[The materials for this note are (1) the Parliamentary Blue Book, Vols. II. and III., (2) the proceedings of the Famine Department of the Government of India, (3) a file of papers, proceedings of the Madras Government, sent by that Government to the Famine Commission as containing all the information in their possession on this subject, (4) Notes of Evidence taken by the Famine Commission, (5) Annual Report of the Sanitary Commissioner, Madras, for 1877.]

On the 19th January 1877, in his Minute No. VII., dated from Cuddapah, Sir Richard Temple wrote as follows[1] :—

"7. Now, the present rate of wages is fixed as two annas per diem for an adult, and proportionately lower for women and children. This rate is fixed upon the supposition that it will purchase one and a half pounds of grain per diem, a quantity which is deemed essential for a man while at work. There might indeed be a question whether life cannot be sustained with one pound of grain per diem and whether Government is bound to do more than sustain life. This is a matter of opinion; and I myself think that one pound per diem might be sufficient to sustain life; and that the experiment ought to be tried. Possibly the gangs might not perceptibly fall off in condition. After a week or fortnight of experience it would be seen whether they so fall off or not; if they were to seriously fall off, then the point could be considered. It is to be remembered that, when these poor people first came on relief, their condition was low, and they needed very full rations. Such rations have been allowed for some time, and the people are in very good case. A reduction might now be demanded in the interests of financial economy and might be attempted for a time at least without danger; at all events the trial might be made for people at task-work, and especially with those who are not really at task-work, and who, though nominally at some sort of task-work, are doing very light or nominal work. One pound of grain ought to be made to suffice. At the present prices, a rate of one anna and a half would purchase a pound of grain and would leave a small margin for condiments, vegetables, and the like. It may be that Government would be willing to allow more than a pound a day of grain if its financial means permitted; but the demands of economy seem to require that at all events a trial should be made as to whether a pound a day might not be made to suffice for the one purpose which is admitted, namely, the staving off of danger by starvation."

2. On the 22nd January he followed this up with a further Minute No. XIV.,[2] answering, by anticipation, the objections which might be raised against it, and urging that as the present number of relief labourers in the Madras Presidency was about 1,200,000, their monthly cost was about 30 lakhs of rupees, and a reduction of the wage from 2 to 1½ annas in the case of an adult male would cause a saving of 7½ lakhs of rupees per mensem. The objections he anticipated were from—

(1.) That 1½ annas per diem will not at present prices purchase sufficient food:
(2.) That it will not sustain the people in robust health:
(3.) That it will not enable a man to perform task-work with all his strength:
(4.) That a reduction will make the relief labourers discontented, and tempt them to rioting.

To the first objection he answered as follows :—

"4. As regards the first objection: at a price of eight seers a rupee for common food-grains 1½ anna will purchase one pound avoirdupois of grain, and will leave a margin for vegetables and condiments. Experience has shown that, though this may not be a large ration, still it will sustain life. In prosperous times the peasantry perhaps eat more, but even in ordinary times it is probable that the poorest classes in many parts of India do not really get more, so much is this the case that in many parts of India half a seer a day, meaning one pound, has passed into a proverb for bare subsistence. I submit that, in such an emergency as this, to give more than such subsistence is beyond the power of Government. Nor can it be said that a man ought to receive more than 1½ anna per diem bare subsistence, because he has to feed those dependant on him; for, as a matter of fact, under the relief system, not only the man, but the wife and children, also receive wages."

To the others his answer was that a very few weeks would show whether signs of physical depression began to manifest themselves among the labourers; that the task would be lowered according to their strength, it being out of the question to give high relief wages merely to get a high degree of task-work; and that there could be no rioting if only those were admitted to the works who were in absolute need of assistance.

3. On the 31st January,[3] the Madras Government accepted this suggestion and issued a resolution which stated that the defective organization of relief-work which had at first existed had been remedied and the supervising staff increased—"the Government there-

[1] Blue Book II., 39. [2] Blue Book II., 56.
[3] Famine, A. Progs., India, February 1877, No. 88., page 190.

fore deem it imperatively necessary to require more systematic and economical administration than hitherto." "Influenced by these considerations and the obvious expediency of maintaining a uniform standard of State relief in adjacent provinces," the following rates of wage were laid down :—

I.—Under supervision by the Public Works Department, or where task-work, not less than 25 per cent. below ordinary task-work, is enforced.

For a man—the value of 1 lb. of grain, plus 1 anna.
For a woman—the value of 1 lb. of grain, plus ½ anna.
For a boy or girl—½ lb. of grain, plus ½ anna.

II.—Under non-professional supervision, and where not less than 50 per cent. below ordinary task is enforced.

For a man—the value of 1 lb. of grain, plus ½ anna.
For a woman—the value of 1 lb. of grain, plus ¼ anna.
For a boy or girl—the value of ½ lb. of grain plus ¼ anna.

"All officers entrusted with the administration of relief operations * * * * * * are very carefully to observe the result of its introduction, and to report weekly till further notice, or immediately, if emergently necessary, the result of this reductlon of wages more particularly as regards the physical condition of the people."

4. On the 13th February,[1] Dr. Cornish, Sanitary Commissioner, wrote objecting to the reduced wage, on the ground that 1 lb. of grain and half an anna could not supply enough nitrogenous nutriment for a man's support. The Government of Madras, 1st March, circulated this letter, in order to warn all district officers of "the importance of the duty confided to them of watching the tentative reduction of subsistence allowance," and directed all civil surgeons to report weekly, after the introduction of the new rate, whether they could detect any loss of power or flesh in the coolies.

5. On the 7th March,[2] Sir R. Temple replying to this letter writes as follows :—

"12. The rates were avowedly recommended by me as experimental, and if they shall be found insufficient, they may be increased ; but it appears to me that they have not yet been found so, and that Dr. Cornish argues from a mistaken premise, which undermines his conclusions. If the poor people were found to be falling off in condition, then I would at once recommend an alteration in the rate. But at present we have no such experience.

"13. As a matter of fact, I must repeat that payments are not made in grain, but in cash. A pound of grain has been estimated as costing one anna, and in no cases have the wages paid been less than an anna and a half, the anna being the supposed equivalent of a pound of grain, and the half anna being available to eke out the ration. An anna, however, represents in most parts of the worst districts more than one pound of grain. At Adoni, for instance, where nearly 50 per cent. of the population were recently on work, one anna will purchase about 1½ lbs. of cholum, which is the staple food of the people, leaving each labourer half an anna to buy pulse, condiments, &c."

"15. There is one point which I must concede to Dr. Cornish's argument. In laying down the minimum scale, it was of course intended that each labourer should be able to consume his own wages, and not have to share them with other persons of his family. These members of the family should either work for themselves or, if unable to do so, should be admitted to gratuitous relief. The case of young children who accompany their parents to the works, but are too young to work, that is, children from one year to seven years of age, has already attracted my attention, and I have recommended in a separate minute that subsistence allowance be granted to them."

6. Paragraph 15 quoted above refers to a Minute of the previous day (6th March)[3] in which Sir R. Temple proposed that children under seven should get half the rate of working children. On the 16th March[4] he telegraphed that the Madras Government had ordered a month ago that children should receive special relief, and that "this is being carried out." The papers before me do not enable me to trace the date of this order.

7. Somewhere about this time an order which I have not yet been able to trace was issued allowing or directing that the wage laid down in Scale II. should be given for seven days in the week although the labourers only work for six.

8. On the 7th March the Government of Madras invited Sir R. Temple by telegram to come to Madras to discuss the question of the reduced rate which they thought of abandoning in consequence of receiving unfavourable reports as to its insufficieney. The discussion was held, and the Madras Government,[5] in deference to Sir R. Temple's arguments, resolved to await reports from other districts before deciding on the adequacy or otherwise of the wage. It was said, however, in the resolution, dated 15th March that—

"There is no doubt, in the opinion of His Grace in Council, from the perusal of the reports already received, as well as from the personal observation of members of Government, that many persons are

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[1] Famine, A. Progs., India, March 1877, No. 66. [2] Blue Book, III., 247.
[3] Famine, A. Progs., India, March 1877, No. 68. [4] Famine, A., Progs., India, March 1877, No. 94.
[5] Famine A. Progs., India, March 1877, Nos. 83 to 96.

to be found in gangs, who are failing in strength either from insufficient nourishment or from other causes. This may arise from their having been previously weakened by insufficient or bad food before coming to the works, or from their having been in bad health, or, again, from the task of work exacted from them being too heavy, having regard to the sustenance given. His Grace in Council, therefore, directs the special attention of all collectors and divisional officers to these predisposing causes. Any persons found in working gangs whose appearance indicates failing condition shall be at once withdrawn from such gangs and placed to some lighter work, or if, on any large work, such persons are found to be numerous and no relief-camp be sufficiently near, they shall be placed together in a special gang and given such additional allowance as may be found necessary, to maintain their health and strength. Where the members of a gang generally show signs of physical deterioration it may indicate that the work has been too great, the allowance of food too small, or possibly that they have not received the full benefit of the allowance granted, either in consequence of malpractices on the part of maistries and overseers, or because they have dependents living upon them, and sharing their bare subsistence allowance, whose wants should have been discovered and relieved, if necessary, by the village officers."

"4. * * * One part especially must never be overlooked, but which has, it is feared, received insufficient attention in some places, namely, the regularity and frequency of payments of wages. With good method and system, daily payments, should be the rule whether in cash or in grain."

9. On the 3rd of April, Sir R. Temple[1] wrote a Minute forwarding the reports made by Dr. Townsend, Sanitary Commissioner to the Government of India, regarding his inspection of famine coolies in the districts of Bellary, Cuddapah, and North Arcot. The detailed results of these inspections will be noticed afterwards. Sir R. Temple says—

"I am able so say that Dr. Townsend's views of this important matter coincide with mine, which have been formed after inspecting nearly 200,000 people under relief in Southern India. And my impression is that the majority of the civil officers, the relief officers, and the engineering officers, employed in supervising relief operations in the Madras Presidency, hold the same views. Yet these officers are in no way wanting in thoughtful consideration of the people, or in energetic care in watching their condition. Of the senior civil officers, Mr. Price, the Collector of Cuddapah, is the only one who has, to my knowledge, reported an opinion that the reduced relief wage is generally inadequate. But that view is not borne out by Dr. Townsend's inspection of some gangs at or near Cuddapah. And from my own knowledge of the relief gangs in that district, I should not be disposed to concur with the collector."

Dr. Townsend's report, dated 3rd April, on the result of his tour of inspection, wound up thus :—

"Taking the evidence that has come before me in the course of my tour, I can arrive at no other conclusion than that the rate to which the wage of the relief labourer was reduced on the recommendation of Sir Richard Temple is sufficient to support them in fair condition, provided that care is taken that the individual recipient is the only person who is supported on it. And I see no reason why the wage should be raised unless an equivalent amount of work is performed."

10. On the 6th April, Dr. Cornish wrote[2] in answer to Sir Richard Temple's Minutes of the 7th and 14th March (the latter of which has not been mentioned above, because it dealt only with the physiological side of the argument, and as this note is only intended to recapitulate what can be learnt as to the practical results of the wage all such discussions are omitted). In it he dwells on the difficulty of conducting an experiment as to the minimum wage under the existing conditions.

"Our relief-works are scattered over many thousands of square miles of country; they are but indifferently supervised, and in no instances are the native supervisors qualified to test the results of any special system of feeding or payment as regards the health of the people. To record the results of such an experiment with the accuracy required, it would be essential to weigh every individual of a gang; to enter their names and weights in columns, and to repeat the weighing week by week for a period of several months; to note also the condition of each individual, week by week, as to anœmia, pulse, tongue, heart's action, muscular power, &c. An 'experiment' of this nature might be carried out, as regards a few persons under the constant observation of a medical man, aided by careful assistants; but it is obvious that the results on a large scale, according to the tests proposed by Sir Richard Temple, could never be ascertained. Sir Richard Temple does not seem to be aware of the fact that 'a week or two' of low living, while doing much mischief, might still give no results measurable by the eye or by weighing.

"There is nothing more remarkable in connection with these famine relief-works than the sudden changes and fluctuations in the personnel of gangs. The people inspected one day may be away the next. The people falling ill and unable to work are replaced by others, and there is never any certainty that two inspecting officers, going over the same ground, within a short interval of time, are seeing the same people. Any comparison of their observations or reports, therefore, can scarcely be gone into profitably, while this uncertainty exists in regard to the identity of the individuals composing the gangs."

In the close of his reply, referring to Sir Richard Temple's expressed opinion that "with very few exceptions the general physical condition of the labourers is as good "now as in ordinary years," he speaks of the miserable state of those fed in relief-houses

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[1] Blue Book III., pp. 317–325.

[2] Ibid III., p. 333.

and by private charity, and adduces the great mortality registered in all the famine districts as showing that the general condition of the population is far below par.

11. In his minute[1] dated 18th April, Sir Richard Temple replied that there is no analogy between the condition of the people in relief-houses, and in the districts generally, and that of relief-labourers. If the people die in the villages and in the relief camp, that shows that they stay away from relief too long, and either die in their village, or apply for help too late, in other words, that the system of village relief is in fault—not that the wage on relief-works is insufficient.

12. At last, on the 22nd May,[2] the Government of Madras decided that the reduced wage (Scale No. II) must be given up, "the weight of the direct evidence being "decidedly adverse to the continued maintenance of the lower rate." Scale No. I was made "of general application to all famine-works, the task to be exacted being not less "than 50 per cent. of a full task estimated according to the physical capability of the "individual labourer in his normal condition." "Labourers unable to perform this "amount of task should not be in the labour gangs at all, but should be on specially light "work or in a relief-camp." Full rates were to be paid for Sundays, but no work exacted; children under seven years old to get 3 pie a-day, and wages to be paid not less frequently than once in three days.

13. On the 29th June,[3] the Government of India said that it was important "for "financial and other reasons, to know the numbers who have been at various times on the "reduced or lower scale of wages," and asked for statements showing for each taluk the rate of wages paid in each successive week from January 27th to May 26th, inclusive, with the number of men, women, and children in receipt of the same. On the 9th July[4] (1877) the Madras Government promised compliance with this request, but the statement has not yet been submitted.

14. I now take up in order the notices I find regarding each district in the file of proceedings sent me by the Madras Government, in answer to my request that they would favour the Famine Commission with a statement of the information the Government had before it when it decided that the reduced rate was too low and must be raised.

## I.—Bellary.

10*th March*.—The collector reports that the new rate came into force between the 15th and 20th February in most cases;[5] there has hardly yet been time to observe the results of the change. Mr. Glenny, sub-collector, has seen no change in condition, nor has the deputy collector, Bellary Division, nor Mr. Howe, who has been in charge of relief-works round Bellary, since 27th February. On one road where there were 7,000 coolies he found 400 or 500 physically unfit; but it is not known if they came in that state to the work or not. The $\frac{1}{4}$-anna to infants is a great boon, and it is hoped the parents will now recover strength.

2. 19*th March*.—Collector forwards reports of subordinates: has not noticed any deterioration himself, but it may be going on all the same. Narsing Rao, temporary deputy collector, says (10th March) the Tahsildars report no change; but one of them would prefer 2 annas for a man's wage. Mr. Glenny (10th March) does not think the condition has deteriorated: the gangs look poorer on an average than they did a month ago, but that is due to the elimination of the conspicuously well nourished. Mr. Howe, (13th March)—the people continue in good condition; the relief camps are attracting from the work the weak and emaciated who are quite unfit for labour.

3. On the 26th, 27th, and 28th March, Dr. Townsend inspected different gangs, nearly 13,000 at Adoni and 10,000 at Bellary. At Adoni it was found that no Sunday wage was given except to the inefficient gangs: a few people were emaciated, but they were always found to be supporting some relative from their wage, or to have fever or some disease. The allowance of 3 pie for infants had not been distributed to the full extent intended by Government. A large gang who had refused to work at a distance of 10 miles, and applied to be admitted again to work near home, were in good case. Near Bellary a party of 7,500 were employed in breaking and stacking metal; the task

[1] Blue Book III, page 384. [2] Famine A Progs., India, June 1877, No. 78, p. 812.
[3] Famine A Progs., India, July 1877, No. 30. [4] Famine A Progs., India, August 1877, No. 70.
[5] Sir Richard Temple says (22nd March, page 509 famine file)—grain wages ceased about 26th February in Bellary.

was such that hardly any ever got the full (reduced) wage, but the majority received $1\frac{1}{4}$ anna, 1 anna and 7 pies respectively, and yet their condition was good, and the officer in charge said they had improved since they came on the work and had certainly not fallen off since the wage was reduced.

4. On the 10th April Mr. Ross, head assistant collector, enquired if the 3-pie allowance was to be given to children every day or only on the days when their parents were present on the works. The Board's reply (approved by Government on the 7th May) was that the allowanee was to be given for every day that the children were present on the works.

5. 12*th April.*—The collector says that the sub-collector, deputy-collector, and two tehsilders, report no deterioration. Some coolies are reduced but must have been so before they came on the works. The collector himself has seen none emaciated, but has been lately in the southern taluks which are better off; does not think the rate should fall below $1\frac{1}{2}$ anna; but as cholum is now 9 to $9\frac{3}{4}$ seers, the man's wage is only $1\frac{1}{3}$ anna.

6. On the 24th April, Sir Richard Temple wrote a minute (No. CX) describing his inspection of labourers at Gooty and Goondakal. He had visited these before, and his impressions were then recorded, as follows[1] :—

"9. On the occasion of his first visit (February 14th) Sir Richard Temple carefully inspected an aggregate of nearly 15,000 labourers collected from Adoni and the villages around. Many of them were poor people dependent for subsistence on their earnings at the works, but many belonged to a better class who were presumably able to maintain themselves. A large percentage were Musalmans, many were weavers and artizans, and there were few persons of low caste. Their general physical condition was good, and very few showed any signs of being insufficiently nourished. On his second visit (February 21st) he saw about 10,000 persons belonging to gangs from the Yemiganur road. The great majority were of extremely low castes, madigars (chamars), and others ranking even below pariahs, and regarded as so low and degraded that their better-born countrymen speak of them as persons 'who cannot come in our mouths,' whose very caste name cannot be mentioned. These are poor people, chiefly leather dressers, and live to a considerable extent on the flesh of the cattle whose skins they dress. They are extremely poor, always inured to hardship, and it is believed that very many of them have hitherto abstained from applying for relief under the mistaken notion that there could be no aid for such as they were, and that if even Government would give it them, the prejudices of their countrymen would prevent it reaching them. The contrast between these gangs and all those previously seen elsewhere was very great. Very many persons were considerably emaciated and had evidently been insufficiently nourished all their lives, and a few only among them had the fine physique and blooming condition so frequently found in other gangs among the better classes. Sir Richard considers that they were many degrees the worst he has yet seen."

"About[2] 4,500 persons were paraded. They were for the most parts ryots and subordinate cultivators, weavers, and working men of the better castes and classes in admirable condition, and bearing no signs of ever having missed a meal. Here and there a few poor-looking specimens, generally of inferior social position, presented themselves, and the contrast between them and the greater majority of the persons present was pointed out to the native officials, who could not fail to see it. Large numbers of the women belonged to respectable castes, and had come to the works to earn a little money, their husbands being employed at home or otherwise off the works. Some cases of cheating by gangmen were exposed, and many persons were shown to be in a position not to require aid from Government.

2. "Sir Richard was astonished by the very marked contrast between these gangs and the gangs of low-caste workmen seen on his second visit to Adoni, and Mr. Glenny remarked that, as regards physical condition, they were the best gangs he had yet seen. There was no sign of suffering among them, and Sir Richard Temple thought that there could be no doubt whatever that very many of them had been admitted to the works much too soon, and would have maintained themselves without difficulty had the works not been open to receive them. He considered that many of them might now be discharged without the smallest danger of their suffering risk of starvation or even of distress."

On this occasion he made the following remarks on the condition of the labourers he saw[3] :—

"One gang (500 strong) of relief labourers employed on the railway at Gooty under professional supervision, on reduced wage and good tasks, were found by me to be in very fair condition. Another large gang (1,000 strong) inspected by me at Goondakal consisted of 800 women and children in fair condition (with some few exceptions), and of 200 men of whom one-third were in indifferent condition, some even in bad condition, most of these latter being new arrivals. From information received from Bellary and Adoni, I learn that in several gangs there are found some persons in weakly condition. These points will doubtless cause some to think that the relief wage ought to be raised. Looking, however, to Dr. Townsend's recent evidence as to the good condition of the able-bodied labourers on the reduced wage which is again confirmed by my own recent observation, and to the importance of not holding out any temptation to able-bodied men to come on relief who might be otherwise able to sustain themselves, I would still strongly deprecate raising of the wage to the able-bodied."

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[1] Minute No. XLIII, dated 22nd February 1877. Blue Book III, page 205.
[2] Minute No. XLIV. *Ibid.*, page 207.
[3] *Ibid.*, III, page 396.

Dr. Cornish, who apparently was with him at the time of his inspection, wrote on the 8th May regarding the visit:—

"The Honourable Sir Richard Temple had at Goondakal, on the 24th April, picked out 41 men from a gang of 180, who, from weakness and emaciation, were obviously unfit for work, and whom he considered should be fed at a relief-house without work. Of these persons, so far as could be ascertained, only 12 had recently come on the works, the remainder having been present for two or more months. In addition to these 41, I noted 18 others who, in my opinion, were in very feeble condition. As, at a previous inspection on 23rd February 1877, Dr. Harvey, Sir Richard Temple's medical attendant, specially comments on the fine physique of the Goondakal gangs, the only inference I can draw from the fact is, that, to quote Sir Richard Temple's own words, the men had been getting thinner and thinner, and weaker and weaker, till at last they have had to be drafted off to gratuitous relief-camps as unfit for work."

7. *25th April.*—The collector states that the sub-collector, head assistant, and deputy collector of Anantapur, see no change: two other deputy collectors think the people are falling off sadly. He forwards these reports. Deputy collector Venkatachellam says (17th April) "it is a known fact to all natives that half a seer of grain is hardly "sufficient for a Single meal for an able-bodied coolie" (*i.e.*, for half a day's food); that the coolies are falling off in strength and growing depressed in spirits; 92 deaths have occurred in one party since the new scale was introduced. A special deputy collector says women eat more than males, and require better nourishment, and their wage ought not to be less than a man's. Both the Deputy Collector, and the two Special Deputy Collectors under them, give a sad account of the condition of the coolies. The Deputy Collector of Bellary writes, 18th April—

"No less than 2,080 coolies have come under my observation, not mere inspection, and I must say that the result has not been encouraging.

"The female coolies outnumber the male beyond all proportion, and the bulk of them are of low physique, many adults and broods of young children looking pale and lank. The grown-up women, though of middle age, when their way at work, (*sic*), and some of their infants strolling about the place passing for miserable moving skeletons. The mothers complain that the -anna allowed to each of the children is not enough to buy sufficient nourishment for it, the pittance paid to themselves scarcely sufficing to buy them a good day's meal. Considering, therefore, the amount of exhaustion resulting from exposure to the burning sun of April and May, and the discouraging indications of the process of wastage among the relief labourers, I would respectfully suggest a gradual increase to the present rates of wages until such time as we could detect a change for the better in their physique."

8. On the 27th and 29th April the Collector wrote again, saying that Mr. Oldham had (on the 21st April) raised the wages in the Adoni Taluk (except in the town of Adoni) to 2 annas for men, 1½ for women and 1 for children; giving the wage for six days only, except to inefficient gangs, and the Sub-Collector Mr. Glenny had raised wages in his three taluks 3 pies all round. Asks leave to give the higher scale all over the district. The reasons given by Mr. Oldham (21st April) are that increased pressure is visible in the condition of the labourers and the time for relaxation has come.

"This pressure is chiefly due to the advancing season and the time the people have been on the works. But there are other causes. The price of grain has risen and is rising, and sometimes it is not easy to get on the remoter works, while at places distant from Adoni the price fluctuates greatly. The evening storms which now frequently occur interrupt payments and cause much inconvenience to the labourers camped on the roads. Their clothes are getting very ragged. The great heat, at a time when they are not compelled to work, is trying; and the recruiting for Nellore has undoubtedly pressed very severely on the adult male labourers.

"In fact it is among the latter that the change is visible, and this accounts for the apparent disproportion in the new rates. The women still look much as before, as no direct pressure has been put on them to go to Nellore. Many of them are in excellent condition, sleek and fat. This cannot be said of any of the men."

Mr. Glenny (21st April) considers that the people are decidedly thinner than they were.

The Board sent on this reference (7th May) saying that there is a strong concurrence of testimony showing that the rates are quite insufficient:—

"And the Board cannot but think that teere is a very serious risk in continuing the lower rates now in force. They seemed to have failed wherever they have been fairly tried; for in many places where the new scale is said to have produced no ill effect, either the coolies have had the advantage of being able to purchase a cheaper grain than that taken as the standard, or they have been able to earn wages for the higher scale of task-work.

"The lower rates are probably now beginning to tell with severity on weakened frames exposed to great heat without any, or with very inadequate, shelter. A continuance of the present experiment may lead to great disaster."

The Government on the 17th May sanctioned the raising the rates generally in the district to 2, 1½ and 1 anna, and said "orders on the subject of a general raising of the "wages rate in the distressed districts will issue separately."

9. Collector, 3rd May.—No deterioration seen by Deputy Collector of Anantapur. Dr. Williams inspected two gangs and found signs of defective nourishment generally, which indications an inexperienced eye could not perceive. Two other Deputy Collectors report that the coolies are getting weaker.

10. *7th May.*—Collector reports that on 3rd May the Deputy Collector, Harpanhalli, raised the wage to 2 annas for men, &c.

11. *15th May.*—Collector to Board. Mr. Glenny observes deterioration in condition of labourers in Alur and Gooty, and has raised the wage 3 pie all round, but wishes this not to be considered an increase but as payment for Sunday. Two Tahsildars report deterioration; other officers do not. Mr. Glenny's letter, enclosed, dated 28th April, says, in Tadpatri the condition of one-fourth of the people on the works has been discovered to be so exuberantly good that it is clear the elimination of unworthy recipients has not been carried out. These last three letters reached the Government after the Order of the 17th May and the General Resolution of May 22nd had been issued.

12. In his evidence before the Famine Commission Mr. A. F. Cox said as follows:—

"At the end of December I was sent to Bellary, and returned here in March. I saw the Temple ration in force then; the people seemed to be getting on perfectly well, and I thought it quite sufficient. There were a large number of people on a great number of works, which I was constantly inspecting. The people always complained of the wage, but I did not think there was any good reason for complaint. I did not inspect any one work constantly, so as to be able to notice and deposo to the progressive condition of the people on the ration. I saw no falling off as long as the ration lasted, and others agreed with me, such as the Collector and Mr. Kitts; and I remember no one who held a different opinion. There was considerable mortality from diarrhœa both on the works and in the villages; it continued equally when the ration was increased. There was very little water, and people drank from filthy stagnant pools. Dr. Cornish never came to inspect any of my gangs while I was here. I should not have advised Government to make the changes in the ration, judging from the state of the gangs under me."

13. It appears that the reduced wage never had a fair trial in Bellary, as the orders were never properly carried out, the Sunday wage not being given; that the Collector was from the first doubtful, and that most of the Native Deputy Collectors were very hostile to it; that the European officers thought well of it till the latter part of April, when they too declared against it; but that no evidence exists that the progress of the experiment was ever carefully watched and followed in the persons of the same individual labourers, still less that any weighments were made. Moreover, the arguments used by Mr. Oldham (paragraph 8) should have led on to raising the rates all round, but to greater care that the rates were proportioned to the prices of food on *the spot*, and to an order that the labourers should get full wages even if on wet days they were unable to work.

## II.—Cuddapah.[1]

1. 17th February, the Collector Mr. J. F. Price reports,—has reduced the rate of task work (as he found the people unable to do "36 cubic yards of earth-work") and calculated the new rates. Task work is not yet being enforced as it should be.

"I fear that with the present scale of wages this can never be done. Making the coolies in this case turn out anything but the veriest pretence of a task, will mean killing them. I beg most respectfully to repeat what I have said before, that the coolies, though for the greater part not what I should call emaciated, are at the turning point, and that they will, I am convinced, under the effect of the present system, go down-hill very rapidly, and soon be in a condition such that they cannot work.

"I do not express this opinion owing to any nervous fear or wish to what I hold to be the worst of courses—pamper the coolies. I have neither the one nor the other, and believe myself equal, if supported, to cope with any difficulty that may arise. I speak from a deliberate consideration of what I have daily seen for very nearly four months which I have passed amongst many thousands of relief coolies, and I feel it my duty, whilst obeying as I have every order that was issued by those in authority over me, to say what I believe will soon be the state of things."

2. On the 23rd February, Sir Richard Temple inspected 1,000 coolies at Cuddapah itself and recorded their condition as middling,[2] but no special remarks were written regarding this visit.

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[1] *N.B.*—It is not clear on what date the new rates were introduced in Cuddapah. Dr. Cornish's letter of 6th March states they were brought into force on 20th February. But the letter in the text implies an earlier date.

Sir Richard Temple (22nd March, page 509 Famine) says cash wages were introduced all over the district about the middle of February.

[2] Minute No. XLV., dated 24th February.

3. 6*th March.*—Dr. Cornish reports a visit of inspection made on the 3rd. Out of a gang of 900 persons employed close to the town of Cuddapah, he found signs of defective nutrition, (*i.e.*, want of fat, looseness of skin, and flabbiness of muscle) in about 75 per cent., signs of anæmia in about 50 per cent., and a peculiarly sad, drawn expression of face, indicative of distress and bad feeling in about 25 per cent.

"In regard to the effect already produced by the reduced scale of wages, there has not been sufficient time to arrive at any definite conclusions. For the first effects of a reduced wages scale we must look to the condition of the old and infirm and the young children, that is, to the *dependents* of the labourers who are incapable of earning a living for themselves, and who have to subsist on the portion of food that can be spared by the bread-earners. These classes are not to be seen on the relief-works. If we desire to know how it fares with them we must seek for information elsewhere.

"The people, although they do not refuse the wages or decline work, are tolerably unanimous in their expressions that the wage is insufficient to give them their food and to keep up their strength, and this opinion is very general also amongst the native officials, who understand the habits and customs of the people; and amongst the European officials whom I met there was no doubt at all as to its insufficiency. The practice in force here is to pay once a week; but with so small a wage, and with so many hungry recipients, I think it should be paid every second day at least."

4. 12*th March.*—Collector forwards reports by Mr. Cox, Special Deputy Collector, Badwail Taluk, dated 8th March. The revised scale of wages is greatly affecting the physical condition of the people, though he cannot assert it is doing so to such an extent as to endanger life. Observes that the wage is fixed according to prices at taluk head-quarters, whereas prices on the works are generally dearer. Collector adds—

"Mr. Cox's experience is of one full week.

"I would respectfully urge the discontinuance of the present scale of wages, which I feel assured will, no matter what precautions are taken, end in disaster.

"The coolies down here (the letter is dated from Pullampett) were on Saturday, for the first time, paid the reduced wages. I inspected over 2,000 this morning. They, as a rule, looked by no means in good condition, and their complaints were incessant. There can be but little doubt as to what their condition after a fortnight upon the existing wages will be."

5. 19*th March.*—Mr. MacCartie, Special Assistant Collector, reports on coolies in Cuddapa Taluk: condition of men unchanged, but some of the older women show signs of deterioration. The reduced rate has stimulated emigration to Nellore, the ragi harvest has furnished the men with ample work, but these women and children have flocked to the works in inconvenient numbers.

"No harm has yet been done owing to the concurrent harvest, but there is no doubt that the present scale of rations will reduce the people very much during the ensuing three months, and so render it difficult to exact the full task.

"In my opinion it would be good policy to raise the scale to the purchasing power of 1½ lb. of grain for each adult with 3 pies for condiments, which appears to be the minimum on which they can work continuously without losing strength."

6. 24*th March.*—Dr. Cornish reports the results of a visit to Madanapilly,[1] the sub-division of Cuddapah. Inspected about 3,000. Their wages had been 2½ annas per man and were reduced to 2 annas six weeks ago.[2] The "Temple" wage has not been introduced at all: from one-third to one-half of the coolies inspected "bore distinct evidence of bad living." "About 50 per cent., though still able to work, were not so "well nourished as in ordinary seasons, and rather more than 30 per cent. showed decided "evidence of distress and privation which, if not arrested, will most certainly lead to "diseased conditions and premature death." Has told the Sub-Collector Mr. Gribble[3]

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[1] On the 1st and 2nd February Sir Richard Temple had visited this sub-division and recorded the following remarks.

"Sir Richard Temple inspected several gangs of relief labourers in and about Madanapally, in all some 3,000 or 4,000 persons. He found that the labourers looked to be in good condition; and it appeared that some proportion of them must have been quite able to support themselves, for a time at least, without Government aid. Hardly any of them appeared to be in a physically reduced condition. Some of them bore on their persons evidence in the shape of good clothes or ornaments that they had not yet been reduced to extremity. The Sub-Collector was of opinion that some of these people could with safety be dismissed from the works, and he anticipated that when the Madras Government orders should be received he would be able to reduce and in future keep down the number of relief labours."

[2] This appears to be not quite correct, as the coolies were paid in grain for some time. *Vide* Sir Richard Temple's minute quoted above, para. 7.

[3] With reference to this, Mr. Gribble's evidence before the Famine Commission may be quoted:

"The Temple ration was introduced in the beginning of March in all cases except this gang, which Dr. Cornish reported on so unfavourably, and in which I refused to introduce it in consequence. This gang eventually got into the relief camp in April, where the ratio of deaths was 2,000 per mille. I remember a gang at Voilpad, inspected carefully, man by man, by Mr. Price and myself in the beginning of February. He spoke of it in his report as in fair working order, though rather low. On the 6th April I inspected it with my Assistant, Mr. Bradbury; of 382 persons we found 129 in really bad condition, and the remainder all showed falling off. On the 7th April, out of a gang of 59 coolies, I picked out 19 as in bad condition. But I

that "any reduction of the wage rate in this district may be attended by disaster," and recommended him to apply for Government orders before introducing the reduced wage in this taluk. On this report the Government passed the following order. (March 30th.)

"The Government note that, as respect the famine labourers, all this has occurred while the men were receiving at least 2 annas per diem. The Collector will therefore not be called upon to introduce the new subsistence wage which has been ordered for general adoption, without further inquiry and report. Mr Price will inquire whether the gangs have been short paid from fraud on the part of the maistries or others; whether they have had a difficulty in getting a sufficient allowance of food for their wages, or whether, finally, there has been any injudicious amount of task-work exacted, to account for the state of things here described."

7. 26*th March.*—Mr. Benson, Head Assistant Collector, reports—has "inspected all "gangs on Chitwail-Hobly road." Did not see them before new rate was introduced and cannot compare their condition: many of them are in very fair condition: about 20 per cent. below par and suffering from insufficient food. Thinks the rates sufficient for women and children, but not for men, who should have half an anna more. The Collector forwarding this says (31st March) "the coolies on this road were inspected by me and I "saw several who were by no means in good condition."

8. 28*th March.*—Mr. McCartie submits his 4th weekly report: has examined all gangs within 10 miles of Cuddapah. No perceptible change; but in each gang "4 or "5 cases will be found, generally elderly men and women, who are plainly suffering from "insufficient nourishment." "The ration is insufficient for the exaction of task-work "worthy the name, and there are many complaints; considerable suffering will be "caused during April and the following months unless the old scale is returned to." But "the harvest has provided some members in each family with work, and many of "the labourers have relations in service about the town." The Collector, Mr. Price, in sending this up remarks (30th March)—

"There can be but little doubt that the reduced scale of wages is steadily telling upon the coolies all over those parts of the district where it has been enforced."

9. 2*nd April.*—Mr. Benson reports—has inspected 1,500 coolies on the Cheyair, under Mr. West, Railway Engineer. The reduced scale had not been introduced[1] nor the 3 pies gratuity given. People in fair condition; not more than 4 or 5 per cent. reduced. Many had dependants to support. Collector forwards this, 4th April, and adds—

"I have seen some 1,200 coolies on the road from Wontimittah to Tungatur. Condition pretty fair, but considerable reduction of flesh amongst women and children. I am inclined to think that the women and children have in some degree been supporting the males of their families who, in consequence of the reduction of wages, have struck. The difference between the present and former rates is, as regards women and children, so small that they come readily enough to the works."

10. 3*rd April.*—Dr. Townsend reported his inspection of Cuddapah coolies on the 29th and 30th March—

"Inspected some gangs of labourers employed in excavation of a tank close to the town of Cuddapah. Dr. Cornish, Sanitary Commissioner for Madras, was kind enough to accompany me. They mustered 950 in all, arranged in gangs of fifty, consisting of twenty men and thirty women and children. The number of children was small; the women greatly outnumbered the men; the people were chiefly the residents of the town and of the villages within two miles, and the Civil Surgeon, Mr. Ayaswamy, stated that a very large number of the women were the wives of syces and other servants of Europeans. The wages given are,—men, 1 anna 5 pies; children above 7, 8½ pies; women 1 anna 2 pies; children under 7, 3 pies. Payment is made on Sundays for six days. The daily task-work nominally exacted is twenty-four cubic yards of earth-work for a gang of fifty. This task, which is very light, was commonly completed, but even if it were not, the wage above mentioned was generally given.

"In my opinion, these people were in appearance little, if at all, below the standard of health common in native populations. Some were no doubt thin and anæmic, but the proportion in this

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cannot assert that this was due to the Temple ration only, nor that the members of the gang when I inspected it were the same individuals as in February. In March, April, and May, I must have inspected several thousand coolies and always with the same result. In almost all gangs about 30 per cent. were in bad condition."

Mr. Traill, Assistant Engineer, also stated—"The Temple ration was in force for a very short time in the sub-division. Mr. Gribble would not introduce it at first till he got a special order, and soon after that the order came to raise it again. Hence I did not observe the effect of the ration; moreover I had not direct charge of the works, and the men were being changed about very much. I thought it a mistake when the ration was ordered, as the people were looking low and were not getting too much wage."

[1] Dr. Cornish, however, writing on 6th April, says Mr. West, C.E., in charge of the Cheyair embankment works, informs me that to meet the views of the district authorities and to avoid the appearance of competition in the labour market, he has reduced his rate from the ordinary 2 annas to the modified scale of Sir Richard Temple's and paid for the Sundays, and that practically his disbursements per head average same as before.

condition was not great. In may instances individuals that struck us as being more enfeebled than others were found on inquiry to have been on the works a very short time, one of them had been on a fortnight, another came on only yesterday. A very thin, weakly-looking woman had come on the works three days ago, another, a Brinjara, had been on only four days. A thin elderly man, who looked weak, was suffering from fever. One man, thin and anæmic, had been on the works from the commencement, but on either side of him there was a very stout strong man who had also been on the works for months."

"Booja road, 3 miles from Cuddapah. Inspected with Mr. MacCartie 800 people divided into gangs, each composed of 20 men, 25 women and 5 children. The women generally outnumber the men, who find other work. The people all belong to the surrounding villages. They are employed in digging and stacking gravel. The daily task assigned is 18 cubic yards for each gang, a more severe task than is imposed upon the laborers at the tank inspected yesterday. It is, however, exacted without difficulty. The rate of wages is the same as the other gangs in the district. The labourers are paid once a week on Sunday, for the six days. A considerable portion of the people in these gangs, as well as in those inspected yesterday, belong to castes who eat meat. The wudars kill and eat sheep and pigs but not bullocks. The pariahs eat carrion or the flesh of bullocks and other animals that have died. The shepherds eat the flesh of sheep and goats that die.

"The general appearance of the people composing these gangs was good. A very large number of the men and women were as stout and healthy looking as they could be in the best of times. Here and there thin persons in weakly condition were observeable, but their history did not prove their condition to be attributable to want of food.

"Gang No. 1. Two thin men, but not unhealthy looking.
" No. 2. One spare weakly-looking man, states that he has been so for years.
" No. 3. Two thin feeble men, state that they have always been so. One sickly child has had fever.
" No. 4. All in good condition.
" No. 5. One feeble-looking man, states that he has always been so.
" No. 6. The same.
" Nos. 7, 8, 9. All in good condition.
" No. 10. An emaciated boy, has been on the works a fortnight and has improved since he joined.
" No. 11. A thin weakly lad, always so.
" No. 12. All in good condition.
" No. 13. A feeble man, has a large spleen ; is better now than he has been for a long time; another sickly looking man has lately suffered from fever.
" Nos. 14, 15, 16. All in good condition.

"These gangs have been established from November last.

"Mr. Quinlass, the relief officer, says that when the people received the higher rate of wages, they did not spend more in food than they do now, but saved the difference. They have not deteriorated in condition since the wage has been reduced. About 15 men who had been sent to Nellore returned again to these gangs. They said the place did not agree with them ; that the water was bad and gave them dysentery The task-work at Nellore appears to be harder and the maistries more severe upon people transferred from other works.

"There were 26 applicants for work. Only one man among them, and he was a ryot who had lost all his cattle, and having no other source of maintenance, came on the works. He was a strong healthy man. The rest, all women and children, were in good condition."

11. *7th April.*—Mr. Cox, Badwail Taluk, reports—Inspection shows but little change in outward appearances, but thinks "they are none the less surely suffering from the "low rate of wages, especially as the hot weather is now beginning to tell on them." In one party 313 coolies in middling condition and 57 indifferent.

12. *16th April.*—Mr. Benson's weekly report—Has inspected the Kodur coolies, and out of 1,764 persons selected 150, or 8·5 per cent. as emaciated. Very few children are employed; "many who could earn 9 pies are kept on the 3-pie list." Condition of coolies pretty fair, but a large number of small children very emaciated; some from fever; most from bad and insufficient food. Hopes the condition of those coolies and their children will now improve—

"*1st.*—Because the work is much nearer their homes.

"*2nd.*—Because the old and weakly are in separate gangs, and the tasks will thus be less for all.

"*3rd.*—Because the 3-pie bonus will be fully availed of.

"*4th.*—Because the more emaciated are being removed to the gratuitous relief list.

"It may be of interest to note—
"(1.) That the old men complain for the most of the insufficiency of the food.
"(2.) All natives say that children from five years upwards eat as much or more than an adult. As a corollary to this, it is observed that the children who get only 3 pies or 9 pies seem to suffer the most of any of the people. At least in their case it is most apparent to the eye.
"(3.) While some of the coolies are emaciated, others labouring beside them for months at the same work and on the same pay are actually robust: neither have any aid for their subsistence, and neither have any dependants to support; second sort of rice is the standard grain taken in fixing the rate of wages.

"At present I do not urge an increase of wage.

"The tahsildars do not notice any falling off in the condition of the coolies."

The Collector adds in forwarding this (April 20th)—

"The coolies are evidently failing in condition, and the wages are not enough. My experience in this part of the district fully bears out what is said by Mr. Benson. The infant population, *i.e.*, sucking children, is in a very bad state. The mothers have not sufficient sustenance for them, and children of this class are dependent upon their mothers alone. I have had to send many such cases into the relief camp. If some special allowance, more than 3 pies, is not made to nursing women, the camp will be filled with them, or the greater part of the infants under eighteen months will die. I most respectfully but most earnestly and strongly, urge that this matter may have the immediate consideration of Government. I have, as will be seen from the district returns, given the experiment of the reduced scale of wages a fair trial. Although from my experience of the famine, from the time it began to be seriously felt, I have been disposed to look upon the measure in an unfavourable light, I believe that I have carried out my instructions coolly and dispassionately. I feel it my duty, however, as a public servant entrusted with heavy responsibilities, and with all deference to the opinions of those in a position higher than mine, to express the conviction that do what we can to arrest it, the consequences of continuing the present system will be of the most disastrous character, and that it will, in the long run, cost the State far more than the scale of wages previously in force would have done."

The Board, in submitting the above, remark as follows:—

"It appears that the child's allowance of three pies has not yet been fully granted. If this is attended to, and if Sunday payments are made generally, which the Board believe is not the case everywhere in Cuddapah, matters may improve. The 3-pie allowance should be freely granted for children at the breast as well as others. Further, it would seem better that the very weakly should be put in gratuitous relief at once instead of being kept at works, and the higher rate of wages should always be paid when increased work renders it admissible."

The order of Government on it was the following (12th May):—

"The 3-pie allowance for children under seven should be made for sucking infants as well as for those which are not in arms; the Sunday wages should in every case be given, and the higher rate of wage for higher task calculated specially with reference to the state of the soil. If these expedients for raising the rate have been already tried, the Government will be prepared to raise the rate for nursing mothers and children."

13. *24th April.*—Mr. Benson has inspected all the gangs on two roads leading to Kodur, 2,153 in all, and found only 64 persons or 3 per cent. in a depressed condition from want of good and sufficient food. This he attributes to—

(1) More general advantage being taken by parents of the 3-pie bonus to children under seven years old.

(2) The removal of several persons in a depressed condition from the working gangs to the gratuitous relief list.

(3) The transfer of the greater part of the gangs from the Kodur-Settigunta road to the Kodur-Chitwail, some five miles nearer their homes, an immensity of physical exertion in walking daily to and from the works being thus saved.

(4) The segregation into a single gang of some 100 old or weakly inefficients which had been scattered among all the gangs previously. These now perform a special task of three-fourths the usual amount. The efficiency of all the other gangs being thus increased, the act was equivalent to a small decrease of task to the able-bodied; but this has been compensated for by employing a larger number of boy coolies at 9 pie who were formerly on the gratuitous 3-pie list."

He adds that there is an improvement in the condition of the 3-pie children, but there are still some wretched specimens of emaciation. The Collector forwards this with the remark that he believes the coolies are able to buy ragi and not rice, but will enquire about this.

14. On the 26th April Mr. Price reports[1] his examination of 5,599 coolies in the Budwail Taluk. He classified them with the following results; "indifferent" meaning those who were unable fully to perform the small task allotted them:—

| ——— | Men. | Women. | Children. | Total. |
|---|---|---|---|---|
| Condition good - - | 17 | 10 | 13 | 13 |
| Do. fair - - | 62 | 69 | 48 | 63 |
| Do. indifferent - | 18 | 18 | 31 | 20 |
| Do. bad - - | 2 | 2 | 6 | 3 |
| Do. very bad - | 1 | 1 | 2 | 1 |
| Total - - | 100 | 100 | 100 | 100 |

After enquiring into the subject, he came to the conclusion that the coolies got their full wage and were not defrauded by any intermediary. The Board wrote, on the receipt of this letter, as follows:—

"3. The report deserves close attention: Mr. Price is a careful observer and competent to form an opinion, and there can be little doubt as to the accuracy of his description. The able-bodied men are

[1] Sanitary Commissioner's Report, 1877, p. 214, 6.

at present just kept going, but their condition is below par; the old men and growing children are very low, and nursing mothers are unable to nourish their infants. The numbers on gratuitous relief are increasing, and, unless some increase of wage is allowed, many on the works must succumb.

"4. There is no reason to suspect fraud upon the labourers, and their low condition cannot be accounted for in this way. Mr. Arbuthnot, in passing through the locality some months ago, found the people much reduced and distress severe, and they have not been able to regain their strength on the relief wages. The reduced wages have told more upon the people at Porumamilla than at Budwail, because, as pointed out by Mr. Price, rice is alone procurable. The fact is that the new scale has there been fairly tried; whereas in most other places where it is in force, a cheaper grain than that on the price of which the scale is fixed has been available. The Board are of opinion that some addition to the wages should be conceded to the classes who seem to suffer most at present, viz., the old persons, the growing children, and the nursing mothers."

15. 27*th April*.—Mr. MacCartie reports—inspected gangs on three roads, 2,060 in number. On one road, no change for the worse: weakly persons about 3 per cent. On another, coolies have improved. On the 3rd (where before they had looked wretched and their wage was calculated on prices lower than they could buy at)—

"This gave them an increase of one pie per head, or the exact amount of concession allowed in a recent Government Order. On inspecting them on the 24th instant, I found a striking improvement in their appearance, as out of 193 inspected, 15 only were in a reduced state, which gives a percentage of $7\frac{9}{13}$ per cent., and the people altogether had lost the depressed look, which struck me on my last inspection over a fortnight before; this must be ascribed to the slight increase in rate and to the fact that more advantage was taken of the provision for non-labouring children of which the people were slow to avail themselves of at first, under the impression that they would be forcibly vaccinated or transported to Nellore.

"On the whole, no harm has resulted, and I consider that the present scale may be continued as far as this taluk is concerned, for a time at least.

"Wages are calculated according to the price of rice and not ragi, which is considerably cheaper than the former."

The Collector adds:—

"Mr. MacCartie's report shows that the coolies are in good condition, but from what he says it is evident that they have, except perhaps at Yerraguntla, not been living upon one 1 lb. of grain. From what I saw of the country on the banks of the Pennair about $4\frac{1}{2}$ miles from Yerraguntla and where the ragi crops had just been harvested, I am inclined to think that the people at Yerraguntla have been able to obtain ragi. I consider that it would be unsafe to alter the present standard."

The Board, in submitting the report, remark (9th May):—

"There seems no need to make immediate change here. The fact that ragi is obtainable, and that the wages are computed with reference to the price of rice, explains the result. The increase of one pie allowed by Mr. MacCartie at Yerraguntla could scarcely have produced so marked an effect."

16. On the 21st April Mr. Bernard wrote the following note after an interview Mr. Benson had with Sir Richard Temple[1]:—

"Regarding the condition of his labourers, Mr. Benson says that the men and women on the works seem to him to be generally in good condition. But among the small children (on 3 pie per diem) he finds, especially at Kodur, a considerable number of emaciated little creatures. Many of these were found on enquiry to have come on the 3-pie allowance within the last few days only. Perhaps they will come round on the 3-pie; meanwhile those who were very reduced have been handed over to the village headmen (Reddies) to be fed at home.

"On the Cheyair embankment the labourers were till recently on the 2-anna scale, but they were reduced to the $1\frac{1}{2}$-anna rate about 20 days ago. Since the reduction took place, Mr. Benson has visited them twice, and he did not observe any sensible reduction in their condition. But then, though the wages are reduced, these labourers now get the Sunday's wage, and also get the 3-pie allowance for children, whereas previously they enjoyed neither of these advantages."

17. Mr. Price, in his evidence before the Famine Commission, made the following statement on this subject:—

"I watched carefully the working of the Temple ration in the Cuddapah district, where I was Acting Collector from the beginning of 1877 till March 1878. It was applied I believe in March, and continued until Government raised the ration in May or June. It was certainly in force for over two months. During that time I personally inspected 10,000 persons, some of the gangs two and three times; and in saying that I observed distinct deterioration, I base my statement upon particular observation of individuals whom I personally remembered. The wage was regulated by the price of rice at the head-quarter station of the taluk; and in some cases the people may not have been able to buy rice on the works at the same rate. There were, however, instances in which the price of 1 lb. of rice paid to the people on works bought more than 1 lb. of dry grain, which was the staple food of the people of the country. Where the latter was procurable, they bought it in preference to rice.

"The greatest difference that I can remember between the rates of rice at the kusba and on the works was from $\frac{1}{2}$ to $\frac{3}{4}$ of a local seer per rupee. At this time all rice used by coolies was imported grain.

[1] Blue Book III, page 394.

"On a work near Cuddapah itself which I knew well, the people deteriorated in condition. They were doing only about one-third of what the Department of Public Works set down as a full day's task. Government ordered that, if short work was turned out by the coolies, we could only fine them to the extent of the six pies, but were never to interfere with the 1 lb. part of the ration. I tried fining them, but gave it up, as I found that it produced sickness.

"There was during all this time an utter absence of vegetable food in the country; but after the cyclone of May 13th, 1877, there was plenty of green food, then came the change in ration, and between the two the coolies certainly improved."

18. In Cuddapah it seems that nearly every possible fault was committed: the three pie allowance was not given regularly, the Sunday wage was not given at all, and the wage was often calculated on prices not obtainable on the works. Mr. Price, the collector, and Mr. Cox were opposed to the lower scale from the first, but Messrs. Benson and McCartie came to, on the whole, a favourable conclusion; and Dr. Townsend's evidence as to the good condition of the labourers near Cuddapah town is decided. In fact, where a large proportion of the labourers were the wives and children of syces and people in service in the town, it is hard to believe that they can have been as reduced as Mr. Price considers they were.

## *III.—Nellore.*

1. It appears that the reduced rate of wage was being gradually introduced into this district at the end of February, when Sir Richard Temple visited it. He thus wrote regarding the coolies:—

"Out of the large number of relief-labourers whom I inspected carefully (about 17,000 in all);[1] very few were found to be apparently in a condition to sustain themselves. The vast majority seemed to be persons of the right sort for these works; that is, persons who really needed this form of relief. Their physical condition was generally fair. But among them were found, sprinkled here and there, persons whose physical state was low and unsatisfactory. Every one of these I brought to the notice of the Collector. The total number at the time of my visit, 55,000 persons on district works and 30,000 on the East Coast Canal (of which latter most belong to the Nellore district), in all 85,000, amounts to six per cent. on the population of the district—a proportion which, though liberal and sufficient to meet the existing distress, is not excessive, considering the failure of harvests."

2. Very little seems to have been recorded by the Collector, Mr. Grose, regarding his opinions on the wage question; but the Civil Surgeon, Dr. Ross, made weekly weighments of relief-coolies on five occasions. It is not stated on what work the coolies were employed; but they were in all cases the same persons who were weighed on the first occasion on the 15th March. The following table shows the result of the weighments to be a general loss of 42 lbs.: the boys alone gained, on the whole, in weight; all other classes lost:—

| | Date of weighments. | Number weighed. | Number increased. | Number decreased. | Increase or decrease of total weight. |
|---|---|---|---|---|---|
| Men | 23rd March | 22 | — | — | + 7 lbs. |
| | 30th „ | 19 | 7 | 9 | — 4 |
| | 7th April | 8 | 1 | 5 | — 19 |
| | 15th „ | 11 | 3 | 4 | — 8 |
| | 21st „ | 11 | 4 | 6 | — 2 |
| Women | 23rd March | 29 | — | — | — 11 |
| | 30th „ | 27 | 14 | 9 | + 17½ |
| | 7th April | 13 | 6 | 7 | — 1 |
| | 14th „ | 18 | 5 | 12 | — 21·5 |
| | 21st „ | 20 | 9 | 9 | — 6 |
| Boys | 23rd March | 11 | — | — | + 2·5 |
| | 30th „ | 11 | 4 | 5 | — 2·5 |
| | 7th April | 8 | 6 | 1 | + 5·5 |
| | 14th „ | 7 | 5 | — | + 9 |
| | 20th „ | 6 | 4 | 2 | + 3 |
| Girls | 23rd March | 17 | — | — | + 5 |
| | 30th „ | 13 | 2 | 10 | — 15·5 |
| | 7th April | 6 | 4 | 2 | — 2 |
| | 14th „ | 6 | 1 | 5 | — 12·5 |
| | 21st „ | 7 | 5 | — | + 13·5 |

In reporting the weighments of March 31st, Dr. Ross said: "It may fairly be stated "from the observations made hitherto that the scale of diet calculated on is insufficient;

[1] Minute dated 6th March, para. 4.

" and yet at this time frogs, fish, and dead-cattle flesh were procurable." On 11th April he wrote :—

"The examination under report, like those which preceded it, yields no very decided result. There are so many disturbing causes, that as regards the question of the sufficiency or otherwise of the rates allowed to relief-coolies to purchase enough food to maintain life these examinations can tend to no useful purpose, unless indeed these disturbing causes be duly weighed. Most of the coolies were able during the week to obtain a considerable amount of meat, fish, &c., without cost of anything more than a little additional labour. One of the coolies confessed that he had had over six pounds of (dead) beef during the week; and as the cattle are still dying rapidly (although not so rapidly as formerly), a valuable addition to the diet of the lower castes will probably be obtainable from this source for some little time to come."

On the 18th April he remarks as follows :—

" There has been a marked falling off in all classes during the week under report, which was quite visible to the eye in most cases. The rain which fell at the end of March killed a number of the weakly and dying cattle, affording an abundant supply of food to the lower castes ; while the river freshes gave a quantity of fish to the fishermen and some other castes. Thus the week previous to that under report showed results somewhat favourable as regards the condition of the relief-work coolies. But the rain which killed the weakly and dying cattle gave forage to those remaining, and the deaths among the cattle became less frequent in the week ending the 7th April. Fish, too, became less easily procurable, and the result is marked.

" The ragi crops have come in ; and as the price of this grain is only one-half of that of rice, and as it contains a much larger proportion of nitrogen, the condition of the coolies who can obtain it is much better than might otherwise have been expected. Mr. Crole, the additional sub-collector, tells me that some of his relief-coolies who are now living on ragi are in splendid condition. I requested that some might be sent me for examination ; and when they come, I will submit a report of the result.

" * * * * They seem to demand more than they could obtain under the best circumstances in the best seasons, and to have perfect liberty of action also. If not satisfied in this respect, they prefer starving in their own houses to going to the relief-camps."

3. On the 17th April, the collector, Mr. Grose, reported that four of his officers noticed no change, six believed they had seen a loss of flesh. Mr. Stanley, in charge of large relief-works, state that his " workmen are in a very reduced state," but attributes this " as much to the inferiority of the rice sold there as to anything else" :—

" All these gentlemen consider that the reduced scale is too low, and most of them comment on the discontent caused thus and by the enforcement of task-work ; but that is not the point.

" As regards my own observations, I may state that when I came to this district, early in March, I was persuaded that the new scale of wages was dangerously low, and so gave anxious attention to the subject from the first. I still believe that the theoretical amount of grain and extras provided for by Government is insufficient to support life ; but the sanitary commissioner himself states that irremediable evil will have been slowly caused before a change is perceptible to the eye ; and I have seen nothing (except the opinions quoted above) to add certainty to my belief, though I have inspected many hundreds of coolies here and in Darsi and Podile, and lost no opportunity of questioning officials who have had opportunities of forming an opinion on the subject.

" The Zillah Surgeon has weighed the same coolies (selected under my orders as fair specimens) week after week, beginning on the 15th March; and I have made it a point to be present as often as possible. The coolies looked very thin and hungry at the first weighment, and they looked just as bad, but not worse, on the last occasion at which I was present, the 17th instant.

" It is not the case in this district that the relief camps are filling at the expense of the relief works. I have only discovered one recipient of gratuitous relief who had been on the works, and he was sent in by Mr. Crole, because of an affection of the eye."

The weighings were continued, and a letter from Dr. Cornish, dated 15th June (quoted in his report, page 221) shows that on the 27th May a general decrease of weight was observed except in the girls. This report is not contained in the Madras file.

4. On the 12th June, however, after the rate of wage had been raised, no improvement was evinced. Dr. Ross then wrote[1] :—

" The deterioration in the condition of the coolies is most marked. It will be more so if the wretched condition in which they were when first examined is borne in mind. A glance at the tables of weights taken at different periods will show a serious falling-off in the condition of the coolies examined, many of them young, or in an age of active growth ; while if their diet during the period they were under examination had been sufficient, almost all should have increased in weight,"

" On this report the surgeon-general makes the following remarks :—

" ' The coolies employed on the relief-works are practically illustrating in their poor bodies the gradual process of dying under a starvation-diet.' "

5. Mr. Crole, who was sub-collector of Nellore in 1877, gave the following evidence before the Famine Commission :—

" *Question* 6.—The Temple ration went on in February, March, and April, and I observed it carefully. There was a road from Rapur to Atmakar, where I watched the coolies, about 1,700 or 1,800.

[1] Sanitary Commissioners Report, 1877, p. 213.

I watched them improve gradually till I drafted them off to the canal. They were in poor condition when they came on the work, and they lived away from their homes. When they became stronger and in better health, I sent them off to the canal. Dr. Ross said that they got dead cattle to eat; but I never observed this, and many were of castes which could not eat such food. I should say I weeded out at least 1,000 in this way who had improved so on the Temple ration that they were too strong for mere relief-works, and were fit for the canal and for piece-work. Some again deteriorated, but I have seen that on all scales of pay. The task imposed was a light one, supposed to be 50 per cent. of a modified hot-weather task; but they really turned out more than this. The women improved as much as the men. Payments were made daily by a superintendent on about Rs. 80. He distributed to gumashtas; they to the gang maistris; and they again, to the coolies. If the outturn was short, they were cut sometimes to a small amount, a part of the pies, never any part of the 1 lb. I was careful to see that the wage was enough to buy 1 lb. on the work, not merely at the cusba town."

6. Dr. Ross's is the most weighty evidence against the wage, since it is based on personal observation and weighment of the same individuals. But Mr. Crole's statement must also be taken as proof that in a large number of cases the wage was sufficient.

## *IV.—Chingleput.*

1. The reduced wage came into force among the gangs employed under Major Murray, special relief officer, on the 18th February. On the 5th March he wrote in his second weekly report: "I do not as yet perceive any difference either in their condition, spirits, "or in the manner or amount of their work. Of course, they grumble more or less,..... "but on the whole, I think, they are doing fairly well on the present wage."

2. On the 6th and 7th March, Major Murray reported, that rice being a little cheaper in Madras, the relief wage had been lowered to 0-1-4 for men (calculated at 10 pie for 1 lb. of rice), and that in consequence all the able-bodied had deserted the works. He objected to the frequent change of wage according to variations of price as unsettling people; urged that if they did get one or two pies too much it was a good thing, and that there should be a low minimum fixed, less than which should not be given as wage; the more so as on Public Works Department works close by they could earn two annas a man. The collector, Mr. Barlow, in forwarding this (10th March) observes that "the "new scale of wages is very low, too low in my opinion; but it was intended only to be "just enough to keep body and soul together," and that the people would be sure to crowd into Madras, hoping to get higher wages.

3. On the 8th March, Major Murray, writing direct to Government, said:—

"Since my last report to Mr. Barlow, the deputy tahsildar in charge here has brought to my notice several cases of fainting at work. Both this officer and the hospital assistant who saw the cases attribute the fainting to no other cause but that of insufficient food."

"Since this order came into force, I have carefully watched our working people, and this morning I have gone over all (about 700) at work here; and though I cannot say I see them much poorer in looks than before, there is, I think, little doubt from all the evidence in the matter that they are insufficiently fed."

4. Next day Major Murray wrote to say, that though rice could be bought in Madras at 1 lb. for 10 pie, at or near the works it cost 12 or 13 pie, so that the workmen did not get the quantity they were intended to get for their wage of 16 pie per man, 13 pie per woman, and 8 pie per child:

"Under present circumstances, where the wage is so small and the food to be bought for it so inadequate, I am decidedly of opinion that the physical condition of the people I inspected this morning at the Poonamallee camp-works is falling off; and they complain bitterly."

The Government order on this was, that the collector was to visit the camp and see to the wage rates in force, and that Major Murray was to "forthwith introduce the "payment of the value of 1 lb. of grain plus half an anna," meaning, apparently, that the wage should be so calculated as to allow the workmen to buy 1 lb. of grain at the rates current on the spot. On the 20th March, the collector reports having paid this visit on the 16th and given orders about the rates, warning the special relief-officer carefully to test the statements of coolies and grain-dealers as to the local rates of food. He adds: "I consider that the working labourers are not in good condition.....I have already "reported that I consider the scale of wages to be insufficient."

5. On the 15th March, Major Murray remarked that the gift of 3 pie for infants only affected the children of low-caste people:

"The high-caste man will not bring his wife or children when unable to work, even if starving to our relief-camps. * * He takes home his daily wage to his village, and it is clear that, if he shares his small earning with others, his physical condition must suffer."

Mr. Barlow, in forwarding this on the 23rd March, says :—

" Nothing strikes me more than the gradually increasing appearance of distress pervading the better classes in this district.

" I do not now see what can be done beyond affording plenty of work and fair wages, and holding village officers responsible for cases of actual starvation."

6. On the 23rd March the collector, Mr. Barlow, reports on the condition of his relief coolies for the week ending 10th March. Some of his officers see no change. Major Murray says, " I do not now think that the people are thriving on the amount of food " to be bought for this wage, and I am of opinion that they are physically falling off " and three other officials say, " the coolies are beginning to look somewhat weak and " emaciated."

7. On the 24th, the collector reports for the week ending the 17th, in almost exactly the same terms. The sub-collector wanted more time to pronounce an opinion. Major Murray's verdict was again unfavourable; one temporary deputy collector said :—

" The coolies certainly did not look to me very robust and in best of health, but, as a rule, they looked tolerably healthy, although there were a few who had an emaciated and bloated appearance about them, the result of low diet."

8. On the 7th April, the collector reported for two weeks ending the 24th and 31st March :—

" 2. The special relief officer states, that he sees no change in the condition of the people under his charge since the date of his last report, and attributes this partly to people now obtaining as wage the full value of 1 lb. of rice at the retail price of the bazaars nearest the camps, plus the extra allowance for condiments, and chiefly to the fact of the wives and children of the coolies, if unable to work, being carefully fed at the camps.

" 3. The deputy-collector in charge of the Saidapet taluk has noticed no changes, but the temporary deputy in charge of the Trivellore taluk says, that there has been a marked falling off in the number of coolies on nearly all the works, and that the physical condition of such as are still employed is gradually but slowly becoming impaired. He is, however, of opinion, that ' where a man spends the whole of his ' earnings on himself, the rates are adequate to provide him with food sufficient for his subsistence.' It further appears, I am glad to say, that the railway works lately begun are attracting a very large number of coolies."

The sub-collector, Mr. McCarthy writes :—

" It appears that the most marked result of the reduction of coolies' wages has been a large falling off in their numbers. This you will observe from the numerical returns for the past week. In most places a large proportion of the coolies withdrew from the works on the introduction of the new rates, though, in some cases, they returned to work again after a few days. This was when they could not get any other employment in the neighbourhood, under the Public Works Department for instance. The Deputy Tahsildar of Utramerur states, that he has observed some deterioration in the physical condition of the labourers, and so also apparently has the Deputy Tahsildar of Chingleput, but none of the others seem to have noticed any such result as yet. It is not an easy thing to note changes of this kind, which can only be very gradual, and I do not think the observations of officers in charge of the works are much to be depended on. One man may imagine he sees a falling off in the condition of coolies when there has been none, while another may fail to observe it when it has happened. For this reason I think it is a dangerous experiment in the hands of inexperienced persons, which can be ill repaid by the small saving of expenditure which may be effected.

" As regards* works under execution by Public Works Deportment, the executive engineer in charge of No. 2 Range says, that the physical condition of the people employed on the Porur Tank is gradually falling off, and that ' the others on other works are not in good condition,' and that ' none of them can be forced to do an average task.' In the reports from other officers of this department it is merely stated that the physical condition of the working classes is generally good or satisfactory."

* Collector, dated 7th April, report for week ending 31st March.

The Board remark on this, that the reports are so conflicting that no reliance can be placed on them, and that as the Public Works Department pay by piece-work, the alleged deterioration there cannot be due to the reduced wage.

9. On the 9th April, Major Murray writes—

" I yesterday took the opportunity of Sunday being a day of rest, to inspect all the labourers at the Poonamali relief camp. This morning I have inspected those at Palaveram. The result of my inspection is, that I believe that these people are losing heart, and that during the last week they have fallen off in appearance and condition.

" I had fancied, or perhaps hoped, that during the two previous weeks, there was no change for the worse in their strength or general well-being, and my reasons for this hopefulness I gave you in my two last reports. I notice, however, now an appearance of listless weariness about them, which is distressing to see in people from whom one is bound to exact a certain amount of work before the daily pittance, which enables them to exist, can be paid. I must, therefore, again bring distinctly to notice that I believe the labourers, who are now working under my orders, are insufficiently fed."

10. 14*th April.*—Collector's report for week ending 7th: The Tahsildar of Trivellore thinks the coolies are low in condition and less capable of hard work than in the previous

week, and the special relief officer states, that they have fallen off in condition and appearance, and are losing heart. Mr. Barlow himself had inspected one camp, and could see little difference in the condition of the working coolies there. The great majority of these are women and children, the bulk of the able-bodied men having gone off to the railway works.

11. 19*th April.*—Collector's report for week ending 14th April, nothing fresh: "The "number employed on local relief works is small, owing to the large numbers on the railway," *i.e.*, the doubling of the line from Madras to Arconum.

12. 25*th April.*—Report for week ending the 21st :—

"The special relief officer states that the labourers on works attached to the Palaveram camp 'are 'generally in poor condition, and are clearly suffering from insufficient food,' while those at the Poonamali camp are in somewhat better condition. The deputy collectors in charge of the Saidapet and Trivellore Taluks have observed no changes since their last report. * * * The complaints as to the inadequacy of the wage, however, continue as frequent as ever."

13. 5*th May.*—Report for week ending 28th April :

"The Special Relief Officer says that 'those of the labourers who have been working on the present 'wage since its introduction, have decidedly fallen off in physical condition,' but the other officers have observed no change since their last reports." "I have especially inspected, since my last report, a fair number of coolies who have been on the works ever since the new wage was introduced. Their condition is not good in my opinion."

14. On the 11th May, he sent up his last report for week ending the 5th May, to the same effect :

"The Special Relief Officer says, 'the people who came under my notice as labourers in this district 'on the reduced scale of wage, are still falling off; and it will be unnecessary that I should furnish any 'further weekly report on this subject, as I am fully convinced, and no further experience can alter this 'conviction, that the reduced scale of wage is insufficient to provide the labourer with the necessary food 'to keep up his physical condition, and at the same time do any work.'

"The Deputy Collector in charge of the Saidapet Taluk has observed no changes, but the officers in charge of relief works in the Trivellore Taluk state that there has been a slight deterioration in the physical condition of the coolies, owing to the insufficiency of the scale of wages, but partly to the excessive heat of the weather."

15. The numbers employed in Chingleput on the reduced wage were too small to be of much service in this discussion. The district officers in general were satisfied with the wage, except Major Murray; and that officer changed his opinion too suddenly between the 5th and 9th of March, for his views to carry much weight.

## *V.—North Arcot.*

1. The reduced scale of wages was introduced among the relief-gangs employed near Vellore on the 3rd March. The civil surgeon of Vellore, Dr. Fox, reported on the 19th March, having repeatedly visited the 1,600 coolies at work on a tank near Vellore, that—

"in my opinion, as a body they have much deteriorated. A very considerable number are weakly and much emaciated, more especially so among the very young and the old; the men (of whom there are but few) and the young women do not show it to so great an extent; but there are very few coolies that could be classed as 'able-bodied,' and even these, who as yet are not very much emaciated, in most instances show symptoms of commencing anæmia in the pale conjunctiva and abnormally white sclerotic. Very few indeed look robust, and all form a striking contrast to the large jail population in this station."

On another work where 400 men were employed in fencing the relief camp, their condition was better and the men and young women looked better than the children and old people.

"The inferior condition of the gangs on the Suriaguntah tank, compared with those at the relief camp may, perhaps, be partly due to the nature of the work which at the tank is much harder; removing thick tenacious mud up a steep incline, and carrying it some distance; it may also be less wholesome, as the mud has rather a disagreeable smell when first disturbed; but both gangs in my opinion show insufficient feeding."

2. On the 31st March Dr. Townsend inspected the Vellore ganges and wrote as follows[1] :—

"1,120 people divided into eight gangs of 32 (*query*—32 gangs of 35 each) in the proportion of 7 men, 16 women, and 12 children. Some of these gangs were formed on the 15th of March, others on the 21st to 23rd, and some as late as the 29th.

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[1] Blue Book III. page 325.

"These people are employed on task-work, the task being 75 per cent. of the ordinary Public Works rates, and they are paid at the following rate:—

| | A. | P. |
|---|---|---|
| Men | 1 | 11 |
| Women | 1 | 5 |
| Children | 1 | 0 |

No allowance is given to young children.

"Payment is made once a week, seven days' pay is given for six days' work. A very large proportion of the men employed were old or elderly and many of them were of spare habits, as is very commonly the case with the natives above the middle age, but they were fairly muscular and their appearance healthy. The younger men were, for the most part, robust and in good condition. The same may be said of the women. Many of the older women were thin and spare and some of them weakly-looking, but the younger women were, for the most part, plump and in good condition. The children on the whole had the appearance of being well nourished."

"Gangs of coolies, chiefly women, employed in fencing the relief camp. These gangs had been established about six weeks, and had been on the reduced rate of—

| | A. | P. |
|---|---|---|
| For men | 1 | 5 |
| „ women | 1 | 0 |
| „ children | 0 | 9 |

"They appeared to be in very fair condition, and there was no sickness among them."

He does not seem to have visited the coolies on the tank of whom Dr. Fox gives so bad a report, and the party he first inspected were on the higher scale of wage; the second party, however, were on the reduced wage.

3. On the 15th April, the Collector, Mr. Whiteside, reported:—

"My divisional officers are unanimous in stating that the rates of wages in force have not produced any unfavourable change in the condition of the labourers employed on relief-works. From my personal observation I entertain a similar opinion, so far as regards present effects of the existing rates of wages on the condition of the people.

"The only officer who complains of the insufficiency of wages and the consequent failing condition of the relief-gangs is Mr. Clerk, in charge of the relief-works in the Punganoor division; and he avers that there is now a very perceptible falling off in the condition of the gangs. I have authorised him to reduce the task-work in proportion to the physical capability of the working-gangs, to make alterations in them according to circumstances, to afford gratuitous relief to the aged or weak relatives of the labourers on the work who hitherto have been dependent upon them for subsistence, and the payment of three pies per diem to all children under seven years of age belonging to the relief coolies and actually present on the works, is also being made."

The Board also remark—

"The state of the case seems to be that where coolies were in good condition to begin with, the new scale of wages has been enough to maintain them in that state, but where they began work in a low state, they have not been able to regain strength on the new scale, or even to maintain their former condition. It must be remembered that the new scale has scarcely anywhere been really introduced in its entirety."

4. Again on the 26th April, the Collector wrote:—

"From the information furnished to me by the various officers in charge of relief works and from my own personal observations, I am of opinion that, during the past week, the reduced scale of wages has not injuriously affected the physical condition of the relief-labourers; on the other hand, the Assistant Collector Mr. Tremenheere, in charge of relief-works in the Chittoor Taluk, has reported to me that he weighed some of the relief-coolies from time to time, but did not find any material deterioration in their bodily weight, and in many instances the coolies increased three and four pounds in weight during the month."

5. On the 14th May the Civil Surgeon of Chittour reported[1]:—

"On the 11th instant and 13th, I inspected about 2,000 coolies; of these, I especially examined 700 one by one. This body of 700 people comprised 350 men, 260 women and 90 children. Of the men, I consider 30 per cent. to be anæmic, of the women 24 per cent., and of the children 20 per cent. Many of those who were anæmic do not appear to have lost flesh, though their health has undoubtedly deteriorated, and daily numbers present themselves at the hospital suffering from dropsy, unable to continue longer on the works, from this cause. Many also (about 100, I am informed) have been unable during the last two weeks to complete their task-work on account of weakness, they have been fined one or two pies in consequence, which further reduced their ration. * * *

"I enclose list of weights of seven gangs of coolies. From the aggregate of these lists, it may be seen that, during the week from May 4th to May 11th, 39 coolies decreased in weight 46½ lbs., and 17 coolies increased 18 lbs., showing a decrease of 28½ lbs. in 56 coolies in a week; and that during the fortnight from April 27th to May 11th, 35 coolies decreased in weight 68½ lbs., and 13 coolies increased 19½ lbs., showing a decrease of 49 lbs. in 48 coolies in a fortnight.

"Again on the 8th June, or a fortnight after the higher scale of wages had been brought into force, Dr. Walker was not able to report any improvement."

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[1] Sanitary Commissioner's Report, 1877, p. 213.

6. In his evidence before the Famine Commission, Mr. Whiteside said as follows:—

"I observed the working of the Temple ration. Mr. Tremenheere was employed under my orders weighing the coolies week by week, and I personally inspected gangs repeatedly who were working on this ration in and around Chittúr. My opinion was that if the whole ration was consumed by the worker and not shared with other members of the family, it was sufficient to keep him in fair ordinary health. It was not enough to improve on, if in a low state of health. I will send Mr. Tremenheere's figures. They were reported to the Board, who pooh-poohed them, doubting if Mr. Tremenheere had weighed the same people; but he was a careful officer and was sure he had done so. I think the ration was a bare subsistence, but not enough to bring up in health those reduced, or to keep in health a man in really hard work; it is dangerously near the mark. The subsequent rate of 1 lb. *plus* 1½ annas was too liberal; people were so happy over it, they evidently did not really want it. The Bombay ration of 1 lb. *plus* 1 anna was, I think, the right thing."

7. Similarly the Collector's Sheristadar, Mr. B. Strinivasachari, stated:—

"I observed the working of the Temple ration on many works in the district. I did not observe in any case the same persons on the same works at consecutive periods of time; but I inspected the gangs on the works and was satisfied with their condition. On two or three works I did inspect the people twice and found some people fatter and some in the same condition, but no one thinner. When they did grow thinner, I should be inclined to suspect that the cause was that they share the ration with other members of their family who did not work."

8. Mr. Tremenheere's weighments have never been sent. So far as they go they would tend to weaken the conclusions drawn from Dr. Ross's weighments, were it not that Dr. Walker also weighed the coolies with such unsatisfactory results. The opinion of the district officers, except the two civil surgeons, is decidedly favourable to the reduced wage.

## *VI.—Coimbatore.*

1. On the 2nd March the Collector, Mr. Wedderburn, reports that the reduced rates had been introduced in four taluks. In three of them the effect produced had been that a large number of coolies deserted the works; no change was observed in the condition of those who remained. In the fourth Mr. Cook, the Special Relief Officer, reported (February 24th)—

"With regard to the physique of the coolies at work since the reduction of wages, I regret to state that I observe a decided falling off. This is more marked among the men than the women. I fear that as the hot weather approaches they will find it very difficult to work in the sun, supported as they are by the miserable pittance allowed them."

In the remaining taluks the labourers worked up to 25 per cent. of a full task, and were paid at scale No. I.

2. 15*th March*.—Collector and Sub-Collector (Mr. McWatters) have examined nearly 10,000 coolies all on Scale I., and saw no signs of defective nutrition, though they considered it was not safe to make any further reduction.

3. 14*th March*.—Mr. Cook reports—

"The condition of the coolies is not as I should wish. They have certainly deteriorated owing to the small pittance we pay them, and say they are unable to do the same quantity of work they were doing before. If we want to keep up the physique of the coolies and help them to ward off cholera in these famine days, it is necessary to pay them higher wages. If Government are not willing to raise wages, lesser work should be exacted from them."

Payments are made bi-weekly, and the wages given are 1½ annas to men, 1¼ to women, and ¾ anna to children. But he has since found that his coolies are doing 75 per cent. of an ordinary task, and he intends to raise their wages to the higher scale. This alteration the Collector and the Government approved. (At this time there was a severe outbreak of cholera in the taluk).

4. 22*nd March*.—Mr. Wedderburn states that he had not understood before that each labourer's wage was intended for himself, and that the members of a family who were incapable of work might receive gratuitous relief. Out of 100 families taken at random aggregating 462 souls, the workers were 163, and the non-workers 299. Work is paid for weekly.

31*st March*.—The Collector submits reports by his Assistant, Mr. Martindale's conclusion was that the deterioration in one taluk was due to the incompetence of the tahsildar who managed the works. Mr. Cook's report is summed up by the Government as showing that while the reduced wage was in force, in February, the coolies deteriorated, but from the 1st March they were paid on the higher scale (No. I.), and since then they have improved.

6. 18*th April.*—The Collector argues that it is better for Government to pay the higher wage to a man who does more work and supports his non-labouring children, than to pay the lower wage to a man who does less work and who gets additional pay for his non-working children. The Board remark on this that even on the higher scale, the man should get extra pay for his non-labouring children.

7. It is clear that in this district the reduced wage was never properly tried; it was only in force in part of the district for a short time, and to the last the local officers never thoroughly grasped the idea that each labourer's wage was intended only to support himself, and not his dependents.

*General.*

In his evidence recorded by the Famine Commission, His Grace the Duke of Buckingham and Chandos made the following statements as the matured and deliberate expression of his opinion on the effects of the reduced wage:—

"11. As to a ration, I think I went too low in approving the Temple ration, 1 lb. + 6 pie. In May it was abandoned; possibly the raised diet was too large for the second member of a family, though not for single persons. It is true vegetable food was wanting; leaves, &c., all dried up in the beginning of the year: afterwards these revived, and may have caused an improved condition of people: during the first period, too, people eat roots, bark, fibres, which may have hurt them. The lowest safe minimum at one period might not be safe at another, and it is hard to make a comparison for that reason. I watched certain gangs for four weeks, who were on the lower ration, and saw a marked loss of condition. In Nellore some gangs kept up condition apparently on the ration, but they also ate, we ascertained, lizards and snakes, which abounded in the jungles close by, and which they spent the nights in catching."

In his report for 1877, Dr. Cornish has treated this subject at length and recapitulates at length some of the evidence which has been quoted above in this note, against the rate, but none of the evidence in favour of it. He sums up strongly against the rate of wage, but adds, that wishing to be impartial he is bound to state two other causes which conduced to lowering the vitality of the people: viz., Alterations in staple of food, *i.e.*, the loss of the millets on which they chiefly live, and the substitution of rice; and the want of all green vegitable food at the hottest period of the year.

Again, on being asked by the Famine Commission to state on what precise examinations of the same gangs of labourers at different periods of time he based his conclusion that they were suffering from the reduced wage, he replied (March 5th, 1879) :—

"4. I have delayed submission of this reply to look over in detail the diaries of Inspecting Medical officers. In several instances, weighments and measurements were taken; in others, the absence of scales and weights interfered with the experiment, and, as a rule, the people subjected to experiment could not be found when wanted for a second weighing. The evidence, therefore, except that from Nellore and Palaveram,[1] is of no value. I must add that the movements of the Sanitary Inspectors were so constant, that they could not undertake periodical examinations of the same gangs.

"5. My general experience, founded on the examination of many thousand coolies, was that under the low scale of wages the people rapidly lost flesh. I saw, with Sir Richard Temple, on 24th of April, at Gundacul, a gang of 180 men, and these, I was assured, were the same people whom Dr. Harvey, two months before, had pronounced to be in such admirable condition that they looked as if they had never missed a meal; and yet out of this gang Sir Richard Temple himself selected 41 as unfit for any work.

"6. At Bellary and Adoni I saw gangs of labourers in April who had a fair proportion of well-nourished individuals; but three months later, in July, there was not, broadly speaking, an able-bodied labourer to be seen in the same districts. The few had either gone off elsewhere to work, or the many had undergone a gradual wasting.

"7. My experience went to show, also, that the higher rate of pay introduced after 22nd May was not immediately attended by any satisfactory improvement in the physical condition of the people. While the rate of wages was increased, food prices had gone up in a corresponding ratio; and those in whom excessive bodily wasting had occured, failed to benefit by the considerable addition to the wages. The evidence on this point in my annual report is important.

"8. But, while my personal experience as to the exact value of the one-pound ration is wanting in detail, I would beg the Commission to understand that evidence of a similar but more exact nature, in regard to many thousands of persons constantly under observation in jails, has been before me for years, and that, on my knowledge of the effects of jail diets, I do not hesitate in repeating, in the plainest of terms, that a diet of one pound of grain in famine times, plus the extras that can be purchased for half an anna (in famine times), is utterly inadequate for the wear and tear of a human being engaged on the daily labour involved in a famine labour task.

* * * * * * *

"11. If the Commission desire to see this question sifted to a practical conclusion, I trust it will support my view that it should be placed in the hands of a committee of scientific experts, with full powers to institute rigid experiments on a limited number of the class of old offenders in our jails.

[1] *N.B.*—No weighments from Palaveram are reported.

It can never be decided by the opinion of this or that person; and it is certainly most important that the issue raised should receive most careful examination. If Sir Richard Temple, and those who think with him, be right, it is quite clear that every jailor within the confines of India is in error, and guilty of wasteful extravagance in the feeding of convicts. In my view, jail administration, based on experience and close observation for many years, is not likely to have erred widely in regard to the quantity of food necessary for the support of a person engaged on moderate or hard labour."

## Section II.—The Relief-wage in Bombay.

Materials for this note: (1) Mr. J. M. Campbell's *Handbook for Famine Officers*; (2) three notes "on the general policy of the Government," &c., by General Sir M. Kennedy and Colonel Merriman; (3) Proceedings of the Bombay Government in the Famine Department; (4) a printed collection of papers containing reports by district officers on the civil agency rates furnished to the Famine Commission by the Bombay Government; (5) Annual Report of the Sanitary Commissioner, Bombay, for 1877.

1. The following is a short statement of the different orders passed from time to time on this subject by the Bombay Government[1]:—

*A.*—For able-bodied labourers on Public Works Department works doing 75 per cent. of an ordinary task—

4th November 1876—

| | | |
|---|---|---|
| Men | - | 2 annas. |
| Women | - | 1½ „ |
| Children | - | 1 anna. |

15th November 1876.—When grain rises to be dearer than 16 lbs. per rupee (the scale was made universal for all prices on 13th December)—

| | | |
|---|---|---|
| Men | - | price of 1 lb. plus 1 anna. |
| Women | - | „ 1 lb. „ ½ anna. |
| Children | - | „ 1 lb. |

19th December.—No work to be done and no wages paid on Sundays.

26th December.—Infants under 7 years of age to get ¼ anna daily.

29th December.—Grain means the medium quality of the cheapest variety.

17th March 1877.—Fractions of a pound to be given in the labourer's favour in computing wages.

13th June.—When work is stopped by rain, labourers to get civil agency rates.

*B.*—For non-able-bodied labourers on civil agency works doing 50 per cent. of an ordinary task—

19th January—

| | | |
|---|---|---|
| Men | - | price of 1 lb. plus ½ anna. |
| Women | - | „ 1 lb. „ ¼ „ |
| Children | - | „ ½ lb. „ ¼ „ |

29th May 1877.—When grain is dearer than 16 lbs. per rupee, the price of ¼ lb. to be given to infants, instead of ¼ anna.

10th August 1877.—When the price of grain reaches 9 lbs. per rupee, an increase of ⅙ to be made to the daily wage so as to provide for Sunday, but no work to be exacted on that day.

2. On the 23rd April the Sanitary Commissioner of Bombay (Dr. Hewlett), after completing a two-months' tour of inspection in the famine districts, reported as follows:—

"The physical condition of the labourers employed on the relief-works in the Mahratta-speaking country, including Sholapur, is, on the whole, extremely satisfactory, and the sanitary arrangements for them reflect, as a rule, great credit on the officers in charge of works."

Dr. Hewlett contrasted the good condition of the labourers in these districts with the condition of those in the Kanarese-speaking districts:

The present condition of the labourers at Sholapur impressed him as to the sufficiency of the rate of wages to enable persons who had been extremely reduced to recover strength and flesh; and if the standard he has formed, viz., the condition of the children and the adult young men and women, be (as he maintains it is) a correct one, and the only safe guide in estimating the physical condition of the people, then, even on civil agency works, the people, it is evident, have from somewhere or other procured sufficient food to prevent wasting, and to keep the children, at all events, plump and with well rounded limbs.

[1] Mr. Campbell's *Handbook for Famine Officers*, page 8.

"The people in the Kanarese districts were decidedly lower, but from the special causes fully met by the recent orders in Government Resolution No. 202 E—709, Local, dated 31st March 1877 If these orders are energetically and intelligently carried out, there is no reason why the condition of these people should not be quite on a par with that of the labourers in the Deccan districts. As far as he can see, every possible contingency is now provided for. The organization of village inspection; the immediate relief of destitute persons out of employment and unfit to work; the establishment of relief kitchens at suitable points; the issue of food to the old, the infirm, and cripples, who are too far removed from the central kitchen; the provision of employment to persons capable of work; the support of young children, with full powers to treat exceptional cases in a special manner, are measures which fully and entirely meet every possible requirement for the good of the people, and must be followed with the best results."

3. On the 27th March, the Commissioner of the Southern Division issued orders to his Collectors and their subordinates to "visit repeatedly the civil agency works and "examine the gangs, to notice whether civil agency rates are sufficient, and whether the "people maintain their condition," and to report their views from time to time.

*Poona.*

4. 29th March.—Commissioner forwards a letter from Collector of Poona (Mr. Norman) (date not given) reporting that—

"since the commencement of large public works in his district the numbers employed on works under civil agency have so much decreased, that it is difficult to say whether the rate of wages allowed on the latter class of work is sufficient or not. Observing that most of the labourers on civil agency works are so feeble and decrepit from age and other infirmities, that it is impossible to say whether their present condition is attributable to insufficiency of food or to natural infirmities; that, after inspecting nearly 20,000 labourers in company with Sir Richard Temple, the gangs which had been longest under the Public Works Department seemed to be in better condition than those which had recently joined from Civil works; and that this is notably the case on the Dhond railway, where some of the gangs, which had recently been sent from Indapur, were certainly suffering from insufficient food. Stating his opinion that a slight increase to the rates allowed on civil agency works is desirable; care of course being taken to employ none who are fit to do a fair day's work under Public Works Department."

5. 18th April.—Collector reports that his three assistants, Messrs. Keyser, Fletcher, and Ozanne, "after personal inspection of labourers on civil agency works, are not "prepared to say that there is any marked deterioration apparent. The children "especially appear to be in good condition."

6. 28th April.—Collector reports: "Nothing has come to my knowledge which "would lead me to suppose that the present rate of wages on civil agency works is "insufficient."

7. Mr. Keyser gave the following evidence before the Famine Commission :—

"I do not feel able to form an opinion about the sufficiency of the civil agency works wage. I do not think one can tell the effect of a wage: from constant inspection I can assert that it kept them in apparent good health, but I am sure it is below the ordinary food of the people of the country; and I suspect secret waste of the system may have been going on which would only appear outwardly after a long time. I had one civil agency work with 600 people, when cholera broke out and about 60 people died; and I had a suspicion that they must have succumbed the more readily through being reduced.

*Ahmednagar.*

8. 8th March.—Mr. Fforde, a special relief officer, writes :—

"I consider the rate of pay on works under civil agency quite sufficient.

"On their introduction I was inclined to think the lesser wages too small; but, since I have had good opportunities of observing their effect, I am compelled to say that they appear to me high enough to maintain the people in comfort, and I think the following facts will go far to support this view.

"On the Kopargaon-Newasa road there were some 600 labourers at work under civil agency; and on my informing them that I should transfer them to works under professional agency, they at once intimated that they would prefer to remain on the lesser rate of pay. * * * * On this road there was an openly-expressed dread of the larger task on the Public Works Department works, and a preference was distinctly given to the lighter task and lesser pay on those under civil agency.

"I have just sorted a body of about 500 labourers on the Chinchala tank and Brahmui road works in this zilla. Out of this number, I have only discovered half a dozen who are unable-bodied, or who have no able-bodied members of their families. * * * * Many of the children had ornaments, and nearly all were chewing sugarcane, showing, I think, that there was no lack of means to live well. There was not a single complaint that the wages were insufficient, nor any demand for an increase, common enough on works where the pay is higher and the work heavier."

16th March.—Mr. Spry, 1st Assistant Collector, writes :—

"This morning I inspected a body of people numbering about 150. About two thirds of these were able-bodied, who had come on to the work since I last visited it for the purpose of drafting such persons on the railway. These I drafted off to-day. The remaining one-third were the less able-bodied whom I had left on the works previously. I do not hesitate to say, and I believe you will agree with me, that

the whole gang looked well and in good condition. Indeed, I think the less able-bodied who had been longest on the work had improved. No single complaint as to the rates, moreover, was made. Hitherto I have been inclined to believe that the civil agency rates were a little too low, but from what I have now seen I must confess that I think they are sufficient to afford a healthy existence."

16th March.—Mr. Hamilton, Assistant Collector, writes:—

"I see no reason to modify the opinion expressed in my letter No. 131 of the 21st ultimo, on the insufficiency of the wages on civil works.

"2. It seems to me that the question might be determined at once by an inspection of labourers, who have worked some time on the reduced wages at a distance from their homes, if there be any such; premising, of course, that they have no other means of subsistence.

"3. In the talukas under my charge, none would work on these conditions; they only remained where their homes were so near that they could visit them frequently.

"4. My opinion is worth little, therefore, compared with the opinion of those who have had charge of Civil works since the reduction of wages."

19th March.—The collector, Mr. Jacomb, writes as follows, forwarding these reports, with reference to Mr. Fforde's letter, paragraph 2:—

"With reference to paragraph 2 of Mr. Fforde's letter, in which he states that the wages on civil agency works appear to him high enough to maintain the people in comfort, I beg to state that the wage of itself is insufficient in my view. The first proof adduced by Mr. Fforde in favour of his opinion that, out of the 600 labourers sent to the Ojhar Canal, only 117 entered themselves, does not agree with the experience elsewhere, as in Mr. Woodburn's taluka preference is given to the Public Works Department works.

"In reference to Mr. Spry's letter, I concur with him (paragraph 1) that the whole gang looked in very good condition; but I have seen another gang decidedly worse; and I should hesitate to accept Mr. Spry's conclusion from the inspection of a single gang, two-thirds of whom are admitted to have been able-bodied, and all to have only recently joined the works, and from no great distance, especially when I believe that the civil agency wage of itself is only sufficient for bare support without any margin whatever for accidents, and that the civil agency works in the worst talukas have been deserted since the introduction of the new rates.

The Revenue Commissioner, Mr. Robertson, remarks on these letters (27th March):—

"Mr. Hamilton has, in the Revenue Commissioner's opinion, hit one of the most important points, when he states people only remained on civil agency rates when near to their homes.

"A careful perusal of Mr. Fforde's letter shows that the people he had on his civil agency works near to Rahuri belonged to a better and well-to-do class, who probably should not be on relief-works. The civil agency works were near their homes.

"Now, it is most possible that civil agency rates may be ample for people near to their homes; yet quite insufficient for those at a distance.

9. 8th April.—Mr. Woodburn, Supernumerary Assistant Collector, has inspected the only civil agency work in his taluka several times. "The people appear to maintain their condition and to be contented. There was no appreciable deterioration. None of them had, however, been more than a fortnight on the work."

9th April.—Mr. Fforde has personally inspected every individual on the works, and their condition appears satisfactory. "The children both weaned and at the breast are "in good condition."

16th April.—Dr. Dunn, Civil Surgeon, inspected, in company with Mr. Spry, two works, one under Public Work Department supervision with about 700 labourers; the other under civil agency with 200. He writes:—

"The gangs of work-people visited by me this morning,—those employed on the Shahpur tank under the Public Works Department, and those on the Sheogaon road under civil agency,—seemed to be in equally good condition. The children, too, seemed particularly plump and healthy.

Mr. Spry adds:—

"I do not think that, under the present system, it can be said that the relief-works are popular. On the reverse, they are not resorted to, except as a last resource. As a rule, the women and children seem in better condition than the men."

10. 4th May.—The collector, Mr. Jacomb, reports: "On the civil agency work near "Nagar I found the people in good condition, with the exception of a few who had "recently joined, and who will receive special treatment." He forwards two reports by Messrs. Hamilton and Fforde on a civil agency work between the Prawara and Mahalungi rivers. Mr. Hamilton says:—

"They are the weakest and poorest set of labourers I have yet seen, and do not get through the task I had originally designed for them. A 100 cubic feet of sand-filling costs 12 annas about, the lead being from 150 to 180 feet. At the same time, the people do not seem to be starving; they are physically a weak lot, and I do not think any interference is necessary."

Mr. Fforde writes:—

"Paraded mothers with infants at the breast. Condition of mothers and infants in most cases good, Infants all capable of eating bread. No falling off in condition of people."

11. 16th May.—Mr. Jacomb sends up reports by Messrs. Candy and Woodburn, which are satisfactory so far as they go, but refer to too small numbers on civil agency rates to be at all conclusive.

12. 7th July.—Mr. Candy wrote as follows:—

"When they came into force last January, I was co-operating with Mr. Spry, and made the first civil agency payment on the Nagar-Sheogaon road. The immediate result was great discontent, some violent talking, and a very general desertion of the work. There was a similar result in Rahuri taluka about the beginning of February."

"I have since seen the working of civil agency rates on the railway and in the Shrigonda taluka. The civil agency gang on the railway, which was under me for a long time, was composed of those really unable to do hard work. They got on very fairly, and I did not observe any deterioration in their condition.

"On the Mandavgaon road the coolies kept very well on civil agency rates, but they did very little work. Where the better class of people engaged in work such as cleaning-out of wells, I found civil agency rates had the effect of clearing them off very quickly.

"I am of opinion that the introduction of civil agency rates in contradistinction to Public Works rates has been most beneficial, and has saved Government a large sum of money; for civil agency rates afford only a bare subsistence, while Public Works rates allow a small margin. Hence idlers, who came on the works to make money, found their hopes frustrated by the payment of civil agency rates."

12th July.—Mr. Hamilton reported—

"The labourers under civil agency in the talukas under my charge have continued in good health and condition on the lower rate of wages, and they appeared to get sufficient to eat.

"I think it, however, very probable that the majority of them either had some small private means or received additional help from their co-villagers. Women with small children were certainly better off than those who had none; for the additional quarter anna per head was more than sufficient for the cost of their food."

"I think the reduction in the rate of wages was felt most by individual men and women without families, though beyond doubt large numbers of such individuals have managed to keep their health and perform a little work."

7th July.—Mr. Woodburn had been too frequently moved to maintain a personal inspection of any one set of labourers, but says:—

"The people generally on these works have kept in fair condition, and I may safely say that those who were thin, who consisted principally of old people and young children, did not fall off in condition after coming to work, and that the thin children improved. Extra pay was given to emaciated children and others."

7th July.—Mr. Fforde points out that the people on civil agency works lived close by, and presumably had some little means of their own to eke out their wage. He adds:—

"As regards the sufficiency of the food which could be bought with the daily ration on civil agency works to keep a labourer in health, I can only give the result of my own observations among people who were undoubtedly badly off. My experience is, that there were few, if any, who could be called unhealthy from lack of food, and there were no cases of severe distress. This was especially apparent among women who were deserted by their husbands, of whom the number has been large, and among widows. But these and the nursing mothers with their infants have been all along in excellent health. Weakness of voice, the most certain sign of starvation, has not in any case been a characteristic of these people."

9th July.—Mr. Apaji Rao, Deputy Collector, says he has not much experience of the work; but "from what I have seen lately of the labourers employed on the works "in Nagar and Newase taluks, I always found them in good condition and "health."

13. On the whole it seems that in Ahmednagar all the district officers, except the collector, were satisfied with the civil agency rates; but the numbers employed on civil agency work were very small.

*Satara.*

14. The only report from this district, printed in the collection of papers, is by Mr. Moore, the collector, dated 7th June. The relief-mamlatdars in three talukas report that the rates of wages on civil agency works are favourable; that they are ordinarily sufficient to subsist a labourer in health, and that no prejudicial effect has been noticed.

*Kaladgi.*

15. 1st March.—The Relief-Mamlatdar, Bijapur, reports strongly against the civil agency rates. A man requires for his support 3 lbs. of jowari flour and 3 oz. of dâl,

besides salt, oil, &c.; by the present rates he gets only 1½ lbs. of flour and nothing else, which will only be enough to keep him alive for a month or two, no work at all being taken from him:—

"The people have now become so feeble on account of insufficient food, that I have found them on civil works, where only weak, old, and infirm persons are admitted, walking with little baskets over their heads at a very slow pace, now and then sitting down, only to be aroused by the dinning and scolding of the mustering karkuns, mukkadams, and others."

This letter was forwarded by Mr. Silcock, Supernumerary Assistant Collector, with the remark that he did not concur. The civil agency rate had only been in force for a fortnight, which was too short a time for a trial; but the relief-mamlatdar himself admitted that no cases of severe distress had happened on the works. He agreed, however, that a Sunday wage ought to be given.

16. 8th March.—The deputy collector forwards reports by two other mamlatdars, who hold that the present rates are insufficient to keep the labourers in health, and are already telling on their physical condition.

17. 9th March.—Relief-mamlatdar Baloji Babaji Thakur reports against the rates. The average quantity of grain a man requires is a seer, and he needs more if he does any work in the open air. Hence the civil agency rate is insufficient, and many have left the works and got employment in the fields, where they can earn half a seer with four hours' labour. Those who remain on the works are persons whose homes are close by and who have private means. Urges that the wage should be four annas a day.

18. 13th March.—Mr. Fleet, 1st Assistant Collector, reports: "It is my opinion "that the present scale of wages is insufficient, and that, to preserve strength and health "among the labourers employed by us, we should allow a man 2½ annas, a woman "2 annas, and a child 1¼ annas." He does not speak of having inspected any works, but forwards the reports of two mamlatdars who also consider the scale insufficient, and one of whom says that the people's complaint that their strength is reduced is, in his opinion, well founded.

19. 13th March.—Mr. S. B. Pandit, Extra Deputy Collector, reports at some length against the wage, but chiefly on the theoretical ground that it cannot be sufficient. He has inspected several works day by day, and observed that the labourers eat their food in the form of gruel, not of bread, which, he thinks, is a proof that the wage is insufficient.

20. 17th March.— Mr. Hogg, collector, sends up all these reports; says that, directly the order came out, he protested against it, and proved by figures that the rate must be insufficient. He then directed his subordinate to report on their effect, and this is the result. Except Mr. Silcock, every one condemns the reduced rate, and most officers consider that even 2 annas would not be enough.

21. On the whole, then, the Kaladgi opinion was decidedly unfavourable to the civil agency rates; but it is clear that this opinion was mainly formed on *à priori* grounds, and that there is no evidence that after careful inspection of the same people for a sufficient period their condition was found to deteriorate. It may perhaps be added that the Bombay Government considered that Mr. Hogg was in fault for having too clearly expressed the opinion which he wished his subordinates to adopt, and that he was removed from his appointment on the ground that the experiment could not have a fair trial under him. Mr. A. Wingate, who took the principal share in the relief administration in this district at a later period, drew up the following statement for the Famine Commission:—

"I think the Bombay scales were ample. My attention was early drawn to the question of sufficiency; and I carefully watched the people in my charge, inspecting the gangs, individual by individual, both on public and civil works, and visiting the villages, house by house. There were many gangs, families, and individuals, whom I knew very well during several months. When dealing with thousands, it is no test of a wage to find here and there somebody weak and ill. At first, I made many inquiries, and I satisfied myself there were reasons why these cases should occur; after that, I simply set aside the exception for exceptional treatment. But to the last I could turn out the Public Works Department gangs, and feel they were as strong and cheery-looking as in a time of great trouble one would expect to find the population. Whatever a wage may be in theory, in practice I know that I can support hundreds of thousands on the value of a pound plus an anna; that a large majority will save on that wage, and that with graduated tasks, proper hospital arrangements, and a nursery for the children of those parents who are selfish or careless, I should fear the results of no inspection. I say so after handling, questioning, and examining very anxiously large numbers, and the same people over and over again during some five or six months of the worst of the famine in the worst part of our worst

district. I go further and say what I thought during the famine, that I could turn the whole Public Works Department people over to a civil agency wage, and pick out for the Public Works Department wage the few thousands who would require it; but I would not perhaps recommend this, unless I had a very strong staff of village relief-officers."

*Sholapur.*

22. The only report from this district (relating to the earlier period) is one from the collector, Mr. Percival, dated 14th February, who considers that both the Public Works Department and civil agency rates should be slightly increased. He forwards a letter from Mr. Acworth, second assistant collector, who, writing on the hypothesis that Government desires to provide every labourer with two full meals of ordinary plain food per diem, shows that the civil agency rates of wage do not provide more than three-fifths of the quantity which (in his opinion) they ordinarily eat.

23. Dr. Townsend, officiating sanitary commissioner with the Government of India, deputed to ascertain whether the scale of wages was sufficient, wrote:—

"March 21st.—Rode out with Mr. Percival, the collector, to visit a gang of labourers employed under the civil authorities in excavating a tank about three miles from Sholapur. These were a much poorer lot than the gangs employed on the Moti Bagh tank. A very large portion of them were old and infirm, or in some way incapacitated for hard labour. Task-work is not exacted, and they accomplish very little in the day. The number employed here was about 300. The men receive 1½ annas, the women 1¼ annas, and the children 7 to 9 pie. The bigger lads are reckoned as women. Children too young to work receive 3 pie each.

"The greater number of these people had been on the work at the above rate of wages since the middle of January. Their condition varied considerably: many were stout and in good condition; others were thin and weakly. The majority of the latter were old and infirm; but there were a few among the lads and young women who were undoubtedly suffering from the effects of insufficient nourishment. These cases, however, had come on the relief-work very feeble and emaciated, and they had improved since. The young children were in very good condition, and looked to be well cared for.

24. In evidence taken by the Famine Commission, the Rev. Harding (missionary) says: "I do not think the wages should have been so low as they were—both the civil "agency and the Public Works Department rates. I formed this opinion from seeing "the condition of the people after they came off the works, not while on them." And Mr. Sadasheo Pandmay Kaikar, manager of the cotton mill at Sholapur, says:—

"The wage ration of 1 lb. plus 1 anna is not sufficient. Two lbs. and one anna are sufficient. I saw the effect of the wage on roads, civil agency, near Sholapur. It made people quite weak, and they became fit for poor-houses. The 3 pies for children were not enough: they ought to get half of what an adult does. Flour or cooked food should be given instead of money wages."

25. About the time (22nd May) when the Government of Madras abandoned the reduced rate of wage on civil agency works the following classified census was taken of the labourers on the Bombay relief works:—

CLASSIFIED STATEMENT of PEOPLE, exclusive of CHILDREN under 7 years of age, upon RELIEF-WORKS in the AFFECTED COLLECTORATES on 19th May 1877.

| Agency. | Total number of people on the work. | Number of persons belonging to the taluka in which the work is situated. | Number of persons belonging to the collectorate in which the work is situated, exclusive of those belonging to the taluka. | Number of Persons belonging to | | Number of persons belonging to manufacturing classes, artisans or mechanics, or who are dwellers in towns. | Number of persons who are holders or sub-holders of land. | Number of persons belonging to the labouring classes. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Other Collectorates. | Foreign States. | | | | |
| P. W. Department Agency. | 338,903 | 190,771 | 99,729 | 29,652 | 18,751 | 15,318 | 132,030 | 188,157 | The difference, 4,321, is owing to the executive engineer, Kanara, and the collector of Dharwar, being unable to classify the people. |
| Civil Agency - | 38,552 | 33,359 | 2,447 | 1,666 | 1,080 | 1,937 | 11,472 | 24,220 | |
| Total - | 377,455 | 224,130 | 102,176 | 31,318 | 19,831 | 17,255 | 143,502 | 212,377 | |

And the Bombay Government, writing on the 11th June, and referring to the passage in the Madras resolution of 22nd May, which said that comparatively few people received the lower rate of wage in Bombay, observed that this was true; for, though at first

nearly half the relief-labourers had been on civil works, at that time only one-tenth was so employed, it having been found practicable to organise the Public Works Department works so extensively that in the great majority of cases the higher wage was given in payment for a commensurate return of good and useful work.

25. On the 9th August, Mr. Robertson, Revenue Commissioner, reports as follows, after calling on all his Collectors for their opinion :—

" Mr. Percival, Collector of Sholapur, has replied briefly as follows :—

'Before reporting, I sent the following questions to my assistants, as, although I know their opinions generally, I wish to obtain as definite answers as possible:—

(1.) Have people who came on civil agency works improved or not?
(2.) Have people on any civil works fallen out of condition to such an extent that they have been obliged to give up the work and come on charitable relief?
(3.) What has been the effect of the rates on the children?

'The answers to these questions are—

(1.) Doubtful, or not improved much.
(2.) No such cases known.
(3.) Good everywhere.

" Mr. Percival observes that Mr. Davidson, who has watched the effect of the civil rates most carefully, sums up thus :—

'As a whole, I think the civil rates, modified by grants of extra allowance to nursing mothers, and with a little straining the point as to when boys and girls should be counted as men and women, and with payment as charity through the village officers to workpeople temporarily unfit for work through illness, have proved quite sufficient to keep the people alive and in health, though not to fully satisfy their appetites, or to keep their strength up to its normal point in an ordinary year.'

" Mr. Percival adds :—

'Soon after I came here, I noticed that growing boys particularly complained of the low rates, and I advised the taluka officers to take a liberal view of such cases, which has been, I think, generally done in this district. It is difficult to fix the exact age at which a boy is to be considered to be an adult; and on civil agency works this must be left to the relief-officers to decide as cases arise.

'With this exception, I think that the civil rates have proved sufficient for all persons on light work, and that the distinction between civil and Public Works rates should be kept up on relief-works.'

* * * * * * *

" The collector of Satara, Mr. Moore, states that, from the opinions which his Assistants have expressed on the subject, and from his own observation, it appears to him that the civil agency rates are sufficient to maintain persons employed on light labour, such as is exacted on civil agency works, in good health and condition.

" Mr. Jacomb, collector of Ahmednagar, observes as follows :—

'In my previous reports on the subject of the civil agency rates I recommended a slight increase, as I considered that the rate was sufficient only for a bare maintenance; but I am inclined to think now, from the way in which the labourers on civil agency works have kept in condition, that the addition of 3 pies, which I once thought necessary as a margin for accidents and off-days, was not, as a rule, indispensable for the sustenance of people on work. In many cases this extra allowance was necessary, and has in reality been provided under the exceptional treatment plan; and I still think that though no harm has come of the reduction of wages, the cost of extras, of village inspection, of feeding weekly wanderers at the relief-houses, of allowances to children under 7 years of age, and of lower-power labour, will about counterbalance the saving that may have been effected under the change of wages.'

Mr. Candy's No. 455, dated 7th July 1877.
Mr. Hamilton's No. 385, dated 12th July 1877.
Mr. Woodburn's, dated 7th July 1877.
Mr. Fforde's No. 113, dated 7th July 1877.
Mr. Apaji Raoji's No. 594, dated 9th July 1877.

" Mr. Norman, collector of Poona, observes that—

'it seems to be the general impression, in which he concurs, that civil agency rates have proved sufficient for the maintenance of the old and infirm, and such persons as are incapable of performing a fair day's work.

'On the other hand, it must be remembered that the orders of Government, under which special allowances could be granted to all persons in need of such assistance, have been freely made use of.

'It is also as well to note that task-work on civil agency works has never been rigidly exacted, partly for want of adequate establishment, but chiefly because the people, being in very good condition, could not be turned off, even if unable to perform the tasks allotted.'

" It will be seen from the above that all the officers in this division, who have now had no inconsiderable practical experience, are of opinion that the civil agency rates are sufficient to maintain those receiving them in fair condition. I concur fully in this opinion. It must, however, be noticed that all lay no inconsiderable stress on the fact that much of the success attending these rates is due to the exceptional treatment which has been sanctioned by Government in certain cases. In Sholapur they have found it necessary to deal liberally when deciding whether young lads should be rated as boys or as men. The aid given to young children and nursing mothers has been also a great boon, as the civil agency rates were not calculated for these exceptional cases."

On this letter the Government of Bombay remarked as follows :—

"The views expressed by the officers of the Southern Division in the report now submitted are confirmed by the recorded opinions of the Sanitary Commissioner to the same effect, and also by the opinions of experienced officers in the Kanarese districts, especially in Kaladgi, the worst of all the districts in the famine area; and Government have, therefore, every reason for feeling satisfied that the wages all through the famine districts, both on civil agency and on Public Works Department rates, when paid under the adjustment of the sliding scale, and for six days only, are safe and sufficient, provided there be a proper and efficient organisation to pick up and deal with special cases of weakly persons."

26. In paragraph 49 of his final minute, dated 24th December 1877, on the Bengal famine, his Excellency Sir Richard Temple thus sums up his matured conclusions on the subject:—

"Subsequently some controversy arose, together with some conflict of medical opinion, as to the sufficiency of these rates, especially as regards the lower scale for those employed under civil agency. The relief-officers, the sanitary officers, and all others concerned, were instructed to watch the effect on the physical condition of the labourers, attention being specially directed to the civil agency gangs. Week after week, month after month, reports came to the effect that the condition of the labourers was not deteriorating. Opinion was at first less confident in respect to the civil agency gangs, but, as experience was gained, these people also were found to continue in ordinary condition. These observations were further confirmed by the sanitary officers after inspection, as also by the Sanitary Commissioner. Later in the season, it was thought desirable to collate all the evidence, including the most recent experience on the subject. And it is now regarded in the Bombay Presidency by all concerned, as an established fact that the scale is sufficient, and ought not, in justice to the public interests, to be exceeded."

27. And in his evidence before the Famine Committee, His Excellency delivered the following opinions :—

*Answer to Q.* 220.—"Speaking with the general concurrence of my advisers and coadjutors in the Bombay Presidency, I have to say that the scales of rations which prevailed in this Presidency have been found sufficient, not more than sufficient indeed, but still sufficient, and no more. In connection with this point, the strictness on supervision must be taken into account. If Government can rely on the relief people obtaining all that they are entitled to, then these rations are sufficient; but Government cannot be confident of this, unless ample supervision is ensured. If, from any circumstances, the affair of relief passes out of control, if the numbers of people on relief multiply faster than the supervision, then we may be quite sure that these people will not get all that they require, and under such circumstances there is great danger of a ration which is barely sufficient being stinted by various sorts of peculations and thus becoming insufficient. In a ration restricted to bare sufficiency, no margin exists for peculation and the ration becomes condemned because it never was fully doled out. Unless therefore Government is quite sure of keeping relief thoroughly under control, unless abuses can be rendered next to impossible, it may be prudent for a time to allow a somewhat larger ration than would otherwise be allowed, upon the plain ground that if perchance poor people do not get all they are entitled to, still they will receive enough to sustain relief. If under any circumstances I were to find that relief people were crowding upon me beyond my power of immediate management, I would allow for a time something over the ration allowed in Bombay, simply as a margin for safety; but, as soon as the affair was brought under control, I would gradually introduce the Bombay ration. If, on the other hand, the affair was thoroughly under my control from the beginning, I would advocate the Bombay ration. This, however, is a matter upon which I am unwilling to dogmatise. If there be any reasonable doubt, I would give it in favour of the people, and would rather incur the additional cost of the enhanced ration than run any risk of endangering life. In the Madras Presidency, the controversy which arose was recorded at the time. I have only now to say that when serious doubts were raised by the local sanitary authorities, I obtained from the Government of India the services of the then highest sanitary officer in India, and, after he had carefully conducted extensive examinations of the relief labourers, his written opinion was received in detail, and my recommendations were guided thereby. Subsequently the opinions of this high medical authority were endorsed by the sanitary officers in the Bombay Presidency. So far, then, as medical authority went, it was amply in support of the recommendations which I made.

*Mr. Caird: Q.* 221.—Did the high authority confirm the Bombay ration?

*Answer.*—Yes, he did. But always, both in the Madras Presidency and in the Bombay Presidency, we provided that there should be extra allowance made for those who required special treatment. This provision was carefully carried out in the Bombay Presidency. How far it may have been carried out in the Madras Presidency I can hardly say.

*Mr. Sullivan: Q.* 222.—Did you not modify your original recommendation in Madras and allow something extra for young children attending along with their parents in relief?

*Answer.*—My original recommendation was open to some misapprehension on this head, which misapprehension I rectified by a supplementary recommendation. At one time the Sanitary Commissioner of Madras appeared to consider that my ultimate recommendation, on the ration generally, very nearly went as far as his own. But be that as it may, shortly after I left that Presidency the Madras Government, according to their own judgment, early in May I think, adopted some slightly increased ration.

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*General Strachey: Q.* 225.—On the whole, did the Bombay ration succeed in the Madras Presidency, or fail, so far as you know?

*Answer.*—I cannot say whether it succeeded or failed, for it was tried only for a short period of about 2½ months, and that not universally. In the month of May 1877, the Madras Government

reverted to the more liberal ration, which ration was, as I believe, in full operation throughout the brunt of the famine in that Presidency. Whether the lesser ration would have proved sufficient or not, had it been persevered in, is a question which cannot now be answered. It never was brought to the test of proper experience."

28. In his Sanitary Report for 1877, Dr. Hewlett wrote the following remarks as conveying his final impressions and experience[1]:—

"The general run of people on the Public Works rates were healthy labourers mostly in the prime of life with their families: but on Civil Agency works, the old and infirm, and less physically capable, were employed, but with them there were always many young adult men and women, and children, who would not forsake their aged relative.

"In judging of the sufficiency of the rates, I always took the condition of the young adult men and women, and the children, as my standard. In India the labouring classes show symptoms of age, comparatively speaking, very early in life, and the normal condition of old men and old women in this country is to be lank, thin, and withered; but their condition would have been no true guide in estimating the general physical condition of the labourers. If I saw that the young men and young women, and children, were well nourished and without any symptoms of wasting, I felt convinced that they obtained sufficient food somewhere or other to maintain health.

"The question which has so often been discussed as to whether a pound of grain for six days in the week is sufficient for a subsistence allowance for a native of India, never really arose, because each man received half an anna besides the value of allowance of grain, with which he could purchase dhall, and a little curry-stuff, vegetables, and salt.

"When first established, I had very grave doubts as to the sufficiency of the Civil Agency rates, and shortly after they came into force I travelled through the Dharwar and Kaladgi Districts, and as before stated, from what I saw in the latter, where, however, I subsequently learnt that the instructions of Government regarding expenditure in charitable relief, and for the relief of young children, had not been carried out as strictly as they should have been, I reported most strongly against the continuance of the rates and urged that, at all events, a seventh day wage should be given; but on visiting Civil Agency works in other collectorates, where the orders of Government had been fully carried out, I was constrained to report that the people on Civil Agency rates obtained sufficient food to prevent wasting. Subsequent and anxious enquiries into the matter confirmed me in the conviction of the sufficiency of the Civil Agency rates for the class of the people who came on to these works and for the amount of labour demanded from them. It became clear that the majority of the people seeking aid on these relief-works had private stores of their own with which they supplemented the rates, whilst those who had absolutely no money and were weakly and emaciated received special treatment and were not put to work until recovered.

"The universal testimony of the district officers went to prove that strong people remained strong, and weakly and attenuated people recovered strength and flesh; and there can be no doubt that these rates, in dealing with large bodies of this class of labourers at all events in the first year of famine, are sufficient, provided that care is taken to supplement the rates by the treatment of special cases and by careful attention to seeing that the allowance for young children is drawn and distributed. Regular daily payments are also an important and necessary measure."

*Summing-up.*

1. The evidence as to the practical working of the lower scale of wage has run to such length that it is advisable to recapitulate briefly the more important heads before proceeding further.

2. The cases in which, after a trial lasting over a considerable time, judgment was pronounced against the reduced wage in Madras, are the following:—

(1.)—At Gundakal,[2] on the 24th April, a gang was found in what Sir Richard Temple considered to be "a fair condition," but Dr. Cornish held that it had deteriorated greatly since it was first inspected in February.

(2.) The Deputy Collector of Bellary,[3] 18th April, found that the females and young children in particular were suffering. But the Native Deputy Collectors of this district seem all to have been led away by a theory as to the quantity of food required for consumption; one committing himself to the extravagant statement that an ordinary coolie requires 4 lbs. of dry grain a day, another holding that women eat more than men.

(3.) On the 21st April,[4] Mr. Oldham found it necessary to raise the wages of his labourers, except in one case, to the higher scale, because the men were falling off, though the women looked sleek and fat. Here no wage was given for Sundays to the ordinary gangs, and up to the 20th March, if not later, the infants' ration had not been fully given: apparently the wages had been calculated on prices at which the labourers could not purchase on the spot, and were not given on rainy days.

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[1] Bombay Sanitary Administration Report for 1877, pages 251 and 252.
[2] p. 8, para. 6. [3] p. 9, para. 7. [4] p. 9, para. 8.

(4.) On the 28th April,[1] Mr. Glenny raised the wages by 3 pie all round; but this was in lieu of Sunday wage which had not previously been given.

(5.) On the 26th March,[2] Mr. Benson thought the male labourers in want, and Mr. Price saw several who were not in good condition.

(6.) On the 16th April,[3] Mr. Benson inspected a large gang at Kodur and found 8·5 per cent. emaciated, especially small children, but many children able to work were not allowed to do so and received only the infants' ration; many infants did not receive it at all, and many persons were on the works who ought to have been receiving gratuitous or special relief. Sunday payments also were not, apparently, made. The result of the introduction of these reforms (that is, of the complete carrying out of the Government order which had hitherto been disobeyed) was that on the 24th April Mr. Benson found only 3 per cent. of the labourers in a depressed condition and a general improvement had taken place.

(7.) In Nellore,[4] the weighments made by Dr. Ross tell of deterioration in the labourers, who seem to have been a peculiarly depressed and emaciated lot from the first; nothing is reported as to the work they did and whether they got Sunday wages or not.

(8.) On 17th April,[5] Mr. Stanley reported that the labourers on his relief-works were falling off, because of the badness of the rice sold to them.

(9.) In Chingleput,[6] Major Murray reported strongly against the wage. At first it was calculated on prices prevailing at a distance, and at which they could not purchase their food; but when that error was corrected they did not, in his opinion, improve.

(10.) At Vellore,[7] the Civil Surgeon found the coolies in a gang, which he had repeatedly visited, falling off in condition; in another gang they kept in good case. Apparently the task in the first case was too heavy, and it seems probable from what Dr. Townsend wrote shortly afterwards they received no Sunday wage.

(11.) The Civil Surgeon at Chittur,[8] reported (14th May) very unfavourably; the coolies were dropping off the works into the hospital, and many were unable to fulfil their task: his weighment shewed decrease in weight. Here it appears probable that the rules as to special treatment were not properly carried out, for the feeble ought to have been put into special gangs and not to have remained in ordinary gangs in the works till they were fit for hospital.

(12.) In Coimbatore,[9] in one taluk, the coolies were found to deteriorate so early as the 24th February; but on the 14th March, finding they were doing a full task according to Scale I., the relief officer raised them to the pay of that scale. If this statement is correct, the severer task on reduced wage accounts for the previous deterioration. Moreover in the reports from this district it is clear that village relief was not actively carried out, but that the labourers supported feeble relations out of their wages.

3. On the other hand, the following are the cases in which the opinion of responsible officers was delivered in favour of the reduced wage:—

(1.) On the 20th March,[10] Dr. Townsend found a party of 7,500 near Bellary who were getting less than the reduced wage, and yet had improved on the works.

(2.) At the same time[11] that Mr. Glenny was raising the wages to make up the Sunday wage, he reported that the condition of one-fourth of the workers at Tadpatri was "exuberantly good."

(3.) On the 3rd April,[12] Dr. Townsend inspected two sets of labourers' gangs near Cuddapah, and although the Sunday wage was not being given he reported favourably on their condition.

(4.) On the 27th April,[13] Mr. McCartie reported favourably of his inspection of over 2,000 coolies: in one case they had received wages calculated on prices at which food was not obtainable on the spot and had fallen off, but they improved again when this error was corrected. This is, however, explained by the fact that wages were calculated on the price of rice, and that ragi had just been harvested and was to be bought cheaper.

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[1] p. 10, para. 11. [2] p. 13, para. 7. [3] p. 15, para. 12; p. 16, para. 13.
[4] p. 19, para. 2. [5] p. 20, para. 3. [6] p. 22, para. 4; p. 23, paras. 9–14.
[7] p. 25, para. 1. [8] p. 26, para. 5. [9] p. 27, para. 1; p. 28.
[10] p. 7, para. 3. [11] p. 10, para. 11. [12] p. 14, para. 10. [13] p. 17, para. 15.

(5.)—Mr. Crole[1] deposes distinctly to the improvement he witnessed among coolies on the reduced wage at Nellore.

(6.)—Dr. Townsend,[2] on the 31st March, inspected the Vellore gangs, and while one party receiving the higher scale of pay were in rather poor case, another party on the lower scale were in very fair condition.

(7.)—Mr. Whiteside[3] reports strongly in favour of the working of the reduced wage, and quotes the weighments made by Mr. Tremenheere in support of his conclusions.

4. In the Bombay Presidency, with the exception of the objections of all the Kaladgi officers but two, and of the opinions expressed by some officers in the early stages of the experiment, which opinions they afterwards saw reason to change, the conclusion of all the responsible officers (except Mr. Keyser, who expresses himself doubtfully) is unanimous in favour of the sufficiency of the Civil Agency wage, which, it will be remembered, was lower than the reduced Madras wage in respect of not admitting a Sunday wage, unless food was dearer than 9 lbs. per rupee.

5. The conclusions to which a consideration of this evidence leads the Commission are as follows :—

6. In Bombay the weight of opinion is given with almost complete unanimity in favour of the ration. The following reasons seem chiefly to have conduced to its success :—

(*a.*) The clearness and precision with which the order was given, and the absence of subsequent modifications, fixed it in the minds of the officers and made it easy to carry out.

(*b.*) The smallness of the numbers to which it was applied admitted of personal inspection of the labourers and supervision of the working of the rule.

(*c.*) The officers who administered it were for the most part thoroughly efficient, and carried out the entire system with discrimination, working this rule in connection with those for the special treatment of the feeble and for village relief.

(*d.*) The labourers in some cases had resources of their own ; in some districts prices were much cheaper than in the Madras famine tract, and in none (except Kaladgi and Sholapur) was the pressure of famine so severe.

7. In Madras the evidence is more conflicting, and the information is so incomplete that it is impossible to deduce from it any definite conclusion as to the sufficiency or insufficiency of the wage. The reduced rate was nominally in force on one class of works from the beginning of February till the 22nd May ; but the Commission have not had the means of learning whether the deterioration was more observable on these works than on those where higher rates prevailed ; or in fact, whether deterioration was observable in any case in which the orders of Government were properly carried out. In several cases where the people in receipt of the wage suffered, the cause is shown to have lain in disobedience of the orders of Government and in neglect of the supplementary measures designed to accompany the wage for actual workers ; in some cases, where the people are said to have prospered, the cause is alleged to have lain in the fact that they were able to procure more food than the relief wage alone could have obtained. On the whole, however, looking to the manner in which the system was carried out and the results which the reduced wage produced on the people who received it, the weight of opinion is against it. The chief causes of its failure appear to have been these :—

(*a.*) The scale of wage was not laid down with clearness and precision ; provision for infants was omitted, and a supplementary rule had to be issued almost directly regarding them ; another supplementary rule was added afterwards regarding the Sunday wage ; these additions and alterations confused the minds of the officers employed, and the result was that in hardly any place were the orders carried out in their entirety.

(*b.*) The numbers concerned were extremely large, so that it was impossible for the relief-officers to supervise them constantly, to ensure that the wage was paid daily and paid in full, and the task suitable to their strength, to watch closely the condition of individuals in receipt of the reduced wage or to secure for them special treatment and exceptional allowances the moment they began to deteriorate and before they became emaciated and fit only for hospitals.

(*c.*) The orders as to special treatment and extra allowances being given to emaciated persons were imperfectly carried out, and in no district was the system of village-

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[1] p. 21, para. 5. [2] p. 25, para. 2. [3] p. 26, paras. 3, 4, 6.

relief in complete and efficient working at the time the reduced rate of wage was in force.

(*d.*) The labourers, probably from the conjoint effect of both physical and moral causes, were in a low condition of body, and failed to improve even under the increased rate of wage given in June.

(*e.*) In most cases the only food obtainable in the markets was rice, to which the labourers were unaccustomed and which may have injured their health.

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## NOTE ON THE RESULTS OF THE ENQUIRIES MADE INTO THE MORTALITY IN THE NORTH-WESTERN PROVINCES AND OUDH.

Govt., N.W.P. and Oudh, No. 596, dated 17th March 1879.

1. *Extent and general results of the enquiry.*—Mr. Bennett inspected 50 villages in about a month's time in the districts of Lucknow, Barabanki, and Rai Bareli. He did not test the census taken in 1869, but was satisfied that the population had considerably increased since then (paragraph 5). In these 50 villages he found that 3,380 deaths had actually occurred in a population of 50,705 against a registered mortality of 3,062, being an excess of about 10 per cent. The rate of mortality was 66·6 per mille for 14 months, or 57·1 per mille per annum.

2. Mr. Roberts in a little over a month inspected 62 villages in the districts of Agra, Etah, and Mainpuri. He took a census in all these villages, and found a population of 35,674 as against 36,588 in 1872 (paragraph 13). The registered mortality in these villages had been 1,882, and the actual number ascertained to have died was 2,298, or an excess of 22 per cent. The rate of mortality was therefore 64·3 per mille for 14 months, or 55·1 per mille per annum.

3. Captain Pitcher began his enquiries in November, and in the course of $2\frac{1}{2}$ months inspected 196 villages in Shahjahanpur, Bareilly, Budaun, Moradabad, and Bijnor. In most of these he took a fresh census, but not in all: and in some villages he was unable to ascertain the registered mortality. Putting these cases aside, in 112 villages he found a population of 26,097 as against a census population of 27,640; and the number of ascertained and verified deaths were 2,052 as against a registered mortality of 2,620, the registration being thus 23 per cent. in excess of the reality. The death-rate, on Captain Pitcher's figures, was 78·6 per mille for 15 months, or 62·9 per mille per annum.

4. *Accuracy of the registration.*—On this subject there is a considerable difference between the opinions formed by the investigating officers.

5. Mr. Benett finds that, on the whole, the mortuary returns were very fairly accurate, and that where errors occurred they arose from very natural causes.[1] People who died away from their villages were sometimes recorded twice over, in their own villages and in the place where they died. On the other hand, the reporting officials themselves were liable to death and disease from starvation; and irregularities and omissions occurred from divided responsibility and from incompetence. But, on the whole, he considers that "an immense improvement has lately taken place in the regis- "tration, and that in a large number of villages it is very nearly perfect."

6. Mr. Roberts' view is not very different. He finds the registration to be considerably below the truth, but is satisfied[2] that in the course of his enquiries he did not discover the whole of the mortality. He especially refers[3] to the difficulty of ascertaining the number of deaths in the case of strangers who die along the road, and of families of which no member remains. He finds that it is impossible to expect the survivors to remember every death that occurred. He believes that, though his verified number exceeds the registered number of deaths by 22 per cent., the real excess was not less than 25 per cent.[4] But, in spite of this, he holds that[5] "defective as the regis- "tration was, it was greatly more looked after than in any previous year." He entertains no doubt that "a smaller proportion of deaths has been unreported this year than was "ever the case before." As to the census of 1872, he throws no doubt on its accuracy at the time it was taken, but shows that since then the population[6] has shifted somewhat from the dry and barren to the canal-irrigated tracts, and that this disturbs the percentages which may be drawn out for any particular locality.

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[1] Paragraph 6. [2] Paragraph 8. [3] Paragraph 6.
[4] Paragraph 21. [5] Paragraph 39. [6] Paragraphs 13—15.

7. Captain Pitcher alone makes an uncompromising attack on the figures both of the original census and of the mortuary registration. As to the former point, he took a fresh census in most of his villages, and found inexplicable discrepancies between it and the figures of 1872. In one village he counted[1] 593 people instead of 186; in another[2] 807 instead of 450; and several other such cases are mentioned in his report, so that he sums up his conclusion[3] thus: "The fact seems certain that the population of the "district up to October 1877 was far in excess of that on which the average for mortality "statistics are calculated." It is of course possible that such gross errors as these may have occurred; though those who were concerned in taking the census of 1872, or those who may read in Mr. Plowden's report the description of the elaborate and careful measures taken for securing accuracy and for testing results, will be rather slow to believe it. But it is also possible that an explanation may be found for the discrepancies which Captain Pitcher was unable to discover. The commonest cause of such apparent discrepancies is the inclusion of a hamlet in, or its exclusion from, the figures of a parent village. The mauza of the Revenue Department, which is the unit of a census, is an arbitrary tract. It may contain several hamlets or none at all; and it would have been impossible for Captain Pitcher to tell whether a given collection of houses a little way off was a separate village or a hamlet attached to the village he was counting without a reference to the revenue records. That this is the real explanation of these discrepancies seems probable from the fact that the total population as counted by Captain Pitcher agrees so closely with that of the census; and he is evidently in error in the assertion quoted above from his 15th paragraph, seeing that his enumeration (26,097) is not in excess of that of 1872 (27,640), but slightly below it.

7. Next, as to the mortuary registration, Captain Pitcher is positive that he verified all the deaths that actually occurred, and that the excess reported is mainly due to the stimulus imposed on the chaukidars, which led them to exaggerate the facts. He holds that[4] "every death in a moderately sized village is, as a rule, well known to, and well "remembered by, the rest of the villagers." In this view he is opposed to the experience of Mr. Roberts, who has shown that, as a fact, such deaths are not always remembered, even where memory was easy[5]; and he makes no allusion to the two cases of special difficulty which Mr. Roberts specifies—the deaths of strangers, and the deaths in families which have altogether disappeared. There seems, therefore, to be a strong *primâ facie* probability that Captain Pitcher is mistaken in thinking that his verified record contains all the deaths that actually occurred; and a reference to his detailed village notes proves that it does not contain them. In many of these notes he enters a remark as to the number of members of the family who had fled the villages; and in several cases he mentions that so many left and have died on the relief-works or in distant parts. Thus in villages Nos. 16 and 17, 89 have left, a large number of whom are supposed to be dead; in village No. 75, out of 23 emigrants 7 are known to have died; in No. 76, out of 124 several; in No. 77, out of 28, 16 have died. If, as Mr. Benett points out, these are entered both in their own villages and in the place where they died, they will be recorded twice over; but, on the other hand, if they are not entered in their own villages, there is great probability that, wandering through the country, and dying in groves or outhouses, they will not be recorded at all.[6] If, then, Captain Pitcher refused to enter in the village records the names of any who died out of the village, he should necessarily have been very careful to enter any strangers who had died within the village; and when a large portion of the population was in such a state of flux as those figures indicate, it would appear probable that there would be very few villages within whose precincts during these fifteen months no stranger's death should have been recorded.

8. The reverse, however, is the fact. There are very few villages against which the death of any stranger is recorded, and, what is more extraordinary, even when they are recorded, these deaths have generally not been counted in. In the case of villages Nos. 28 and 29, 4 strangers died in each, and their deaths have been added to the total; but in No. 33, 2 are noted as having died within the village, and yet are not included in Captain Pitcher's total of deaths. In No. 49, 4 such deaths occurred, but are not included; in No. 54, 3; in No. 64, 2. In Nos. 90, 92, 93, 110, the same omission occurs. And in the great majority of villages no allusion is made to the subject. Now, it is admitted by all observers,—and Captain Pitcher confirms[7] the fact,—that "there

[1] Paragraph 16. [2] Paragraph 36. [3] Pararaph 15.

[4] Paragraph 8.

[5] Comp. paragraph 7; the case where the deaths of Ahir infants, though recorded in the infanticide registers, were not entered in the death returns, nor remembered by the people. Mr. Benett, however (paragraph 3), found that in the case of relatives the memory of the survivors was good.

[6] Comp. Mr. Roberts' paragraph 55 as to the omission to report deaths of wanderers.

[7] Paragraph 84.

" was far greater mortality in proportion among those who left their homes, whether for " poor-houses, for relief-works, or to wander in search of friends or work," than among those who stayed at home. If, then, Captain Pitcher's figures show almost exclusively the mortality among those who remained at home, it follows that they cannot be accepted as a complete record of the entire mortality. And the probable conclusion is, that the reported deaths, as they fell short of the true numbers in the other two tracts inspected, so in Rohilkhand also they erred by default and not by excess.

9. The general conclusion on this head appears, then, to be, that the mortuary registration was below the truth. But all three officers are agreed that the work of registration was much more carefully performed than usual. On the other hand, they have not perhaps made sufficient allowance for the fact that the difficulties in the way of accuracy were so much greater than usual. A chaukidar may be expected to report the deaths of people whom he knows; but when a large mass of population is in movement, and people are dying along every road and in out-of-the-way places, it is almost impossible that all such deaths should be recorded. In other provinces it has been held that the registration was worse in famine than in ordinary times. Dr. Cornish writes:[1] " Death registration in ordinary seasons fails to take note of more than two-thirds of the " actual mortality. In famine seasons, with the disorganisation of village life and communal " administration, it is probable that not one-half of the actual deaths, especially in the early " months, were ever recorded." It has been shown that considerable improvement in the system of reporting was effected; but it required considerable improvement in order that the Province should not fall back and the registration become worse under the increased difficulties. It is possible to contend that the same ratio existed in 1878 as in other years between the registered and actual mortality—hardly that a closer relation existed. Where one officer finds that 10 per cent. of the *known* deaths and another that 22 per cent. were not recorded, it is not unreasonable to suppose that the *unknown* deaths of wanderers must have raised the actuals to at least 30 per cent. above the recorded numbers.

10. Several improvements in the system of registration (such as the preservation of the record, and the entry of the name of the deceased, without which verification is hardly possible) have been suggested in these reports; and it has been shown that great errors exist in the supposed population of certain registration circles—errors due apparently either to original mistakes of addition, or to subsequent transfers of villages from one jurisdiction to another without a corresponding alteration of the totals. These points will no doubt be attended to by the Local Government, and need not be further referred to here.

11. *Causes of death.*—Mr. Benett finds[2] that the 3,380 deaths registered by him can be assigned to the following causes:

| —— | Deaths. | Per Cent. |
|---|---|---|
| Hunger | 1,723 | 51 |
| Small-pox | 686 | 20 |
| Fever | 443 | 13 |
| Other causes | 528 | 16 |

12. Mr. Roberts classifies as follows,[3] separating the mortality into two periods:

| —— | November.—June. | | July.—December. | |
|---|---|---|---|---|
| | Deaths. | Ratio. | Deaths. | Ratio. |
| Hunger | 221 | 18·4 | 57 | 5·4 |
| Bowel-complaints | 110 | 9·3 | 175 | 15·8 |
| Small-pox | 276 | 23 | 34 | 3 |
| Fever | 476 | 39·1 | 708 | 64·4 |
| Other causes | 112 | 9·5 | 128 | 11·4 |

[1] " Influence of Famine on Growth of Population," page 17.
[2] p. 19, Abstract of Form I.
[3] Statement 3.

13. Captain Pitcher gives[1] the following figures for 27 villages of Shahjahanpur and for the rest of the districts inspected by him, with a population of 37,176 :

| | Deaths. | Ratio. |
|---|---|---|
| Want - - - - - | 1,549 | 56·5 |
| Small-pox - - - - - | 339 | 12·4 |
| Other causes - - - - | 856 | 31·1 |
| Total deaths - - | 2,744 | 100 |

the general death-rate on the population being 76·5 per mille.

14. *Small-pox.*—All officers agree in stating that they find no connection between the prevalence of small-pox and the acuteness of famine. Mr. Benett shows[2] that it was severest when famine mortality was lightest, and vice versâ: "So invariably is it "the case that in places which have been decimated by famine there is hardly a trace of "small-pox, and vice versâ, that a hasty reasoner might be inclined to regard famine as "a prophylactic against the disease."[3] But he holds it possible that the same disorganisation of the seasons which produced the famine may have rendered the human body unusually susceptible to epidemics. Mr. Roberts says[4]: "I am not disposed to think "that the mortality due to small-pox was in any appreciable degree influenced by "privation due to scarcity." And he goes on to mention a village where twice as many Brahmins died as Chamars; the former being free from any distress, and the latter suffering severely from privation. "Many villages escaped the small-pox "altogether, and when it entered a village, it spread among the well-to-do quite as much "as among the poor." Captain Pitcher, too, speaks[5] of small-pox as occurring in the houses of those well to do, rather than those who might be supposed to be in straitened circumstances.

15. *Starvation.*—Mr. Benett reckons[6] that in the tract inspected by him, out of a population of 45,000 souls, 1,521 died from famine, or at the rate of 33·8, and that these deaths occurred at the following periods: from November to February, 20; from March to June, 6·5; from July to December, 7·5 per mille. Applying this ratio to the population (partly modified by local circumstances) of the whole of the famine tract, he finds[7] that, out of a population of 715,000, the deaths from starvation amounted to 18,850. He believes that the mortality began in November and December, and was most acute from the middle of January (after the fall of rain, which destroyed field labour at the wells) till the middle of February (when the fields began to yield some sustenance), being at the rate of 15 per mille for that period. After the harvest-time there was no more famine; but distress began to reappear in May, and continued till the rains were well established.

16. Mr. Roberts believes[8] that the number of deaths from starvation was considerably underrated, both from failure to record such deaths at all in the case of wanderers and from unwillingness to attribute this as the cause, especially in the case of the higher castes, among whom there was a feeling of shame in acknowledging such deaths. He divides his record into two periods—from November to June, and from July to December. And with reference to the number of deaths recorded in the second period (57), he observes[9] that they were due, not to want of food, but to breakdown of the constitution owing to privations endured during the scarcity; many of the deaths occurring among returned emigrants. The returns of the Agra Poor-house are quoted to show that, while there were 1,481 deaths in the first period, there were 1,232 in the second; many of the latter however being due to the fever epidemic which raged in Agra in the autumn of 1878.

17. Captain Pitcher considers[10] that no starvation deaths occurred after the cutting of the rabi; but he speaks of many deaths from eating new grain, which probably is only an indirect form of death by starvation. His village notes show that he believed many

[1] Statements 3 and 4. [2] Paragraph 44.
[3] This is probably true in a sense which Mr. Benett did not intend. Those who have died of famine cannot die again of small-pox.
[4] Paragraph 47. [5] Paragraphs 51, 57. [6] Paragraph 42.
[7] Paragraph 46. [8] Paragraph 53. [9] Paragraphs 57 and 58. [10] Paragraph 26.

of the deaths to be wrongly attributed to starvation, and to be really due to small-pox. The grounds for this presumption are not stated.

18. *The classes that suffered.* (1) *Sexes.*—On this subject much useful information has been collected. First, as to sexes. Mr. Benett's returns show the deaths of 583 adult men against only 263 adult women, or 19·20 and 8·5 respectively of the numbers he recorded. Mr. Roberts, out of 126 classified cases, finds deaths of 42 adult males and only 8 adult females.

Captain Pitcher records 570 adult males and 213 adult females as dead, or 2·67 adult males to every adult female.

19. The explanations given are—

(1) [1]that the woman keeps the household stores and helps herself;
(2) that she has ornaments, which she sells on her own behalf;
(3) that women's work, like sweeping the houses of the rich and grinding, continued when field labour was stopped;
(4) that a husband will rather starve himself than see his wife starve;
(5) that the brunt of the struggle falls on the men wandering in search of employment, watching crops at night in the extreme cold, &c., from which the women are free;
(6) [2]that women are less ashamed to beg and importune for help than men;
(7) that there are more men than women in the general population.

20. Mr. Roberts (paragraph 59) thinks there was some disinclination on the part of the men to ascribe their women's deaths to starvation; but Mr. Benett strongly rejects this (paragraph 28). It will be remembered that the same phenomenon of an excess of male over female deaths is seen in the returns of the two Southern Presidencies and Mysore.

21. (2) *Castes.*—Mr. Benett took great pains to classify the deaths specially recorded as famine deaths according to castes, and to work out their ratio to the total population involved. Mr. Roberts did not compile any such statistics, thinking that caste is not a complete indication of a man's position in life. Captain Pitcher records with great fulness the statistics of all his "verified" famine deaths by castes. The results are shown on the margin. It is admitted by every one that the weavers suffered very severely. In Bareilly both the cotton crops were lost, so that they were deprived of their supply, and also the market for their cloths, if they wove any, was dead. In Rai Bareli, however, the Koris, though weavers by caste, are mainly employed in ordinary years on field labour. As to the Kahars, Captain Pitcher (paragraph 34) makes some interesting remarks showing how they have suffered from the progress of civilisation as well as from the hardness of the times.

| Caste. | Ratio of Famine Deaths per Mille of Population. | |
|---|---|---|
| | Mr. Benett. | Captain Pitcher (Shahjahanpur omitted). |
| Koris | 80·6 | 28·4 |
| Julahas | — | 50·4 |
| Chum | 64·0 | 65·2 |
| Pasis | 57·72 | 59·2 |
| Lodhs | 50·44 | — |
| Ahirs | 26·0 | 16·0 |
| Kurmis | 17·68 | — |
| Brahmins | 5·72 | 7·5 |
| Thakurs | 3·64 | 6·8 |
| Banjaras | — | 23·0 |
| Barhais | — | 30·6 |
| Kahars | — | 25·8 |

22. (3) *Occupations.*—A more important classification is that by occupation. Mr. Benett shows that[3] in his tract the mortality was almost entirely among the labourers. He divides the population thus—

| | Per-centage of population. | Per-centage of total number of deaths. |
|---|---|---|
| Cultivators of more than 5 bighas | 25 | 10 |
| „ less „ | 30 | 22 |
| Labourers | 20 | 68 |
| Non-agriculturists | 25 | — |

Here the 68 per cent. of deaths attributed to labourers includes a few, but not many, rural artizans, such as washermen, potters, tailors, &c. It was these rural labourers who suffered far more severely than any class; and as most of the cultivators holding less than 5 bighas (or 3 acres) live more by field-labour than by the profits of cultivation, Mr. Benett attributes about 80 per cent. of the deaths to the labouring classes. Of the cultivators proper, he says[4] that they suffered severely, especially from the loss of cattle,

[1] Mr. Benett's paragraph 28.
[2] Captain Pitcher's paragraph 29.
[3] Paragraph 26.
[4] Paragraph 37.

but that few died of starvation. The landowners[1] were never near the point of famine. Mr. Roberts observes[2] that "it was the poor who starved, mostly field-labourers. "Cultivators and zemindars did not, as a rule, want for food, as they had resources in "the sale of their property and in borrowing." Captain Pitcher finds[3] that "the "mortality affected chiefly the very old and the very young among the labouring "classes, both in the villages and towns." "The sufferers were chiefly aged people and "young children among tenants with small holdings, agricultural labourers, and village "artizans. Beggars in the villages do not appear to have suffered heavily."[4] In his classified list of castes (Statement 4) he distinguishes in 15 cases those who are cultivators from those who are labourers, with the following results:—

| | Total population. | Total deaths from all causes. | Ratio per mille. |
|---|---|---|---|
| Cultivators - - - | 17,546 | 329 | 19 |
| Labourers - - | 3,722 | 290 | 78 |

All of these are apparently field-labourers, as the list includes no such castes as weavers, potters, &c., who are often both artizans and agriculturists, and the mortality among them is nearly four times as great as among the cultivating classes proper. It is to be regretted that neither Mr. Roberts nor Captain Pitcher have given any information bearing on the question whether tenants with occupancy rights were found at all better able to resist the effects of the drought than tenants-at-will.

23. *Special local causes of excessive mortality.*—Mr. Benett shows[5] that in the districts which he visited the tract where famine was acute was a low rice-producing tract, in which the failure of the crop was complete. On each side of it, as the ground rises and other kharif crops are grown which did not suffer so much, the death-rate becomes less. Mr. Roberts dwells on the influence of the severe epidemics of small-pox and fever on the death-rate. Putting them aside, and looking at starvation-deaths, which he distributes thus[6]—

| | |
|---|---|
| Agra - - - | 6·1 per mille. |
| Etah - - - | 7·8 „ |
| Mainpuri - - - | 3·4 „ |

he offers the following explanations. The constitution of the resident population has to be considered. Taking four registration circles in Agra, he finds that two of them, Hatkant and Bah, are inhabited by poor and low-caste people; two, Batesar and Kachaura, by well-to-do Brahmins. And the figures are—[7]

| | | | |
|---|---|---|---|
| Hatkant - - - | 35 | per cent. of the mortality due to famine. | |
| Bah - - - | 21 | „ | „ |
| Batesar - - - | 12 | „ | „ |
| Kachaura - - - | 9 | „ | „ |

Also the emigration from the dry tracts and to the irrigated tracts disturbed the population and lowered the recorded mortality of the dry tracts unduly.

24. Captain Pitcher found[8] that the mortality was greatest in the valleys of the Ramganga and other rivers and in tracts where rice is chiefly grown; and this he attributes to the insanitary condition of these villages, though it seems possible that Mr. Benett's explanation may be the true one here also, viz., that rice was the crop that failed most signally. He also reports that the mortality depended a good deal on the character of the village population and their mutual relations. The mortality was lowest where the people were homogeneous[9] and mostly of one caste and ready to help each other; where the relations of zemindar and tenant were not strained, but friendly[10]; where rents were paid in kind, not in cash;[11] where rents were not rigorously exacted.[12] These conclusions would be of higher importance if Captain Pitcher had possessed any previous acquaintance with the locality, or had been able to devote a longer time to the inquiry so as to ensure a thorough acquaintance with the local peculiarities of these villages. He does indeed state (paragraph 91) that "it can be shown that the difference "in adjoining circles and adjoining villages is due to the assistance given by zemindars "and head cultivators to their dependents;" but he has omitted to show it. Neither his report nor his village notes contain the data on which these generalisations are built up.

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[1] Paragraph 38. [2] Paragraph 81.
[3] Paragraph 23. [4] Paragraph 96. [5] Paragraph 47.
[6] Paragraph 66. [7] Paragraph 78. [8] Paragraph 24; paragraph 32 (*b*) and (*c*).
[9] Paragraph 32 (*a*). [10] Paragraph 42. [11] Paragraph 75. [12] Paragraph 77.

25. *Effect of relief measures on the mortality.*—We come next to a very important branch of the enquiry,—what influence on the mortality was produced by the remedial measures adopted by the Government? In the parts inspected by Mr. Benett there seem to have been only three poor-houses, relieving on an average less than 500 people between them, while private relief-houses supported about 1,000. It was impossible, therefore, that much benefit could be traced to these operations. Besides which, his evidence as to the popular aversion from this mode of relief is extremely strong, and contrasts singularly with the experience of 1861 and 1869, when no such violent dislike was recorded; but, as Colonel Baird Smith states, every Native Relief Committee unanimously agreed that the system of giving cooked food ought to be rigidly adhered to. The relief-works were on a more extended scale, and Mr. Benett believes[1] that they had a most unmistakable effect in keeping down mortality. His figures may be tabulated as follows:

| —— | Number of distressed Population. | Average Number relieved in February 1878. | Relief per cent. of Population. | Rate of Famine Mortality per mille. |
|---|---|---|---|---|
| Drigbijaiganj - - | 250,000 | 13,500 | 5·4 | 18·87 |
| Haidargarh - - | 50,000 | 1,280 | 2·56 | 47 |
| Mohanlalganj - - | 140,000 | 720 | ·71 | 66 |

The severity of famine was nearly equal all over this tract,[2] though perhaps most severe[3] in Mohanlalganj; and the difference in the death-rate is attributable, in Mr. Benett's opinion, to the extent to which employment was given on relief-works.

26. Mr. Roberts considers[4] that the relief-works must have been very efficacious in preventing starvation; but the labourers not being local, but brought often from a distance, the effect cannot be traced in the death-rates of particular localities. He observes, however, that in Etah the expenditure relatively to population was twice as great as in Agra, and thinks this may account for the lower famine mortality in Etah. But this argument is partly vitiated by the fact that there were no special relief-works at all in Etah. Mr. Roberts probably alludes to ordinary works carried on in the district, which no doubt gave assistance to many impoverished labourers, though not specially organised for relief purposes. As to poor-houses,[5] he only remarks on their unpopularity, and the fact that they were mostly tenanted by wanderers in the last stage of exhaustion brought in by the police. They can hardly have acted, therefore, as measures of local relief.

27. Captain Pitcher found that little or no good was done by relief-works. They were mostly roads, the work on which moved on rapidly; and villagers would go to them as long as the work was going on near their homes,[6] but left when it passed on to a distance. Poor-houses, he thinks,[7] were too much hated and dreaded to do much good. To be useful at all, there should be completely separate enclosures for the lowest castes; but he deprecates any reliance on them for the purposes of famine relief.

28. *Suspension of revenue; advances to landlords; and assistance given by landlords to tenants.*—Mr. Benett admits[8] that suspension of revenue cannot reach the labourers, who are the real sufferers, but he yet thinks it a more important measure even than relief-works, since it is more important to keep cultivators from debt and ruin than labourers from death by starvation; and it may enable a small proprietor to employ hired labour. Many landowners in Drigbijaiganj tahsil opened relief-works, and some, but not all, took advances from Government for this purpose. Some gave loans to their tenants,[9] and more stood security for them with the money-lenders. From quarter to half the rent remained in arrears, it being impossible[10] by the exercise of any severity to collect it.

29. Mr. Roberts states[11] that, though the revenue was suspended in the autumn, it was collected afterwards in full out of a poor rabi; but he finds that the exaction of the

[1] Paragraph 56.
[2] Paragraph 47.
[3] Paragraph 49.
[4] Paragraphs 91 to 93.
[5] Paragraph 94.
[6] Paragraph 73.
[7] Paragraphs 72, 84.
[8] Paragraph 52.
[9] Paragraph 50.
[10] Paragraph 38.
[11] Paragraph 95.

revenue did not influence the mortality in any appreciable degree; and the fact that it could be collected with little more than the ordinary pressure shows that the demand did not exhaust the credit of the zemindars. It did, however, compel a good deal of borrowing. In both Etah and Agra about Rs. 15,000 were advanced as takavi, and these advances did great good, and are spoken of with gratitude. Zemindars could not do much to help their tenants, but where they did, the deaths from starvation were less. The great number of labourers who wandered from their homes shows, however, that but little was done in this way.

30. Captain Pitcher hardly touches on the subject. He says[1] towards the end of his report that, "if the revenue is suspended liberally, and the zemindars are told that "illiberal behaviour to their villagers will be taken notice of," no other relief measures would be needed in the case of only one harvest failing; but he does not show how the relief would reach the labouring classes, nor does he give any facts leading up to his conclusion.

31. There are sundry other interesting points brought out in these reports which have not escaped the notice of the Famine Commission; but they are not alluded to here, as the object of this note is to deal only with the question of mortality.

32. To sum up; these reports have given some useful information as to the points mentioned in the close of the Famine Commission's letter of the 27th December 1878. It has been shown, and may be accepted as generally correct, that the effect of relief-works, where they were large and numerously attended, is traceable, though not very clearly, in a diminished mortality; that in one tahsil in Oudh, where the landowners behaved with remarkable liberality, their exertions, coupled with the Government relief measures, went a long way to enable the people to resist the losses by drought; that most of the numerical discrepancies in the death-rates of adjoining circles were due to errors in recording the total population of those circles, and not to differences in the condition of adjacent and similar tracts; that the classes who suffered most were the field-labourers and rural artisans; after them the town artisans; while the cultivators escaped with little, and the landlords with no loss of life.

33. With regard to the remaining question asked in the above quoted letter, His Honour the Lieutenant-Governor has, in Mr. Robertson's letter of 17th March, stated the order in which he would place the districts according to the severity of their sufferings from famine—an order which, as there remarked, agrees to some extent, though not closely, with the order in which they stand in paragraph 14 of Dr. Cuningham's letter, and in one case disagrees signally, since Azamgarh, a district in which the death-rate was very low, and in which there were hardly any relief measures taken, is considered to be one of the districts that should stand high in the list.

2nd May 1879. C. A. E.

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## NOTE BY THE HONOURABLE SYED AHMED KHAN BAHADUR, C.S.I., ON THE CAUSES OF THE UNPOPULARITY OF THE POOR-HOUSES IN THE NORTH-WESTERN PROVINCES AND OUDH DURING THE FAMINE OF 1878.

In the reports by Messrs. Benett and Roberts and Captain Pitcher, deputed by his Honour the Lieutenant-Governor to enquire into the causes of mortality in North-Western Provinces and Oudh, the following passages occur, regarding the feeling entertained towards the poor-houses.

Mr. Benett writes as follows :—

*Para.* 54. *Native feeling about cooks.*—"It is almost unnecessary to say that the explanation lies in the reluctance to take food prepared under Government auspices. We think it sufficient to provide a Brahman cook, but this is a great mistake. Brahmans of one family will not eat food cooked by Brahmans of another. Thakurs will not eat food cooked by a Brahman at all, unless they know that he is a man of good family and of good moral character. I do not think that any of the respectable classes would eat food cooked by a Brahman of notoriously bad livelihood. Some castes, the Gwalbans Ahirs, for instance, will not touch food cooked by a Brahman, and Gararias throw away food cooked by

[1] Paragraph 86.

themselves if a Brahman has come into contact with it. Most of these difficulties might be overcome in the case of a relief kitchen kept open by a wealthy Hindu. The character, at least, of the cook can be depended upon, and that the food has been prepared with a proper regard to the ordinances of religion. This can never be the case with a Government kitchen; in addition to the ever-wakeful apprehension of attempts on their caste, the Hindus feel that they have no security that any low scoundrel may not have been selected to cook, or even that he is a Brahman at all. When the Bachrawan relief-work poor-house was removed to Dirgbijaiganj, where cooked rations were distributed, all the poor of the smallest pretence to respectability declined to follow it, though they had been drawing three pice per diem with the greatest thankfulness. The tehsildar of Dirgbijaiganj sent out a chaprasi to bring in a colony of 14 Ahirs and Lodhs whom he knew to be starving at a village a few miles off. They said they would rather die than lose their caste, and a week later two miserable old Ahirs crawled in saying that all the rest had died, and that being left alone they had no longer the spirit to resist the food that was so near them."

*Para.* 55. *Use of distribution of cooked rations.*—"The objections to the distribution of cooked rations are, then, that it does no appreciable good, and that, while it saves an infinitesimally small portion of the dregs of society, it leaves good men to die."

Mr. Roberts says—

*Para.* 94. *Poor-houses.*—"There was the greatest objection among all classes of the people to avail themselves of this form of relief. In no villages that I visited did any of the higher castes, however poor, admit that they entered one; even among the lowest classes, loss of caste seems to have been occasionally the result of it. The poor-houses were largely recruited by starving wanderers whom the police compelled to come in; as a great number of these were in the last stage of starvation, the mortality in the poor-houses was excessive. In Agra poor-house and hospital, the deaths from the opening of the poor-houses to their closure in October 1878 were 2,674: all these may be put down to starvation. In view of the reluctance of the people to enter them, it may be fairly alleged that nearly all the recipients of poor-house relief, who did not die there or then, or shortly after leaving, but for the poor-house would have perished. I have not been able to ascertain to my satisfaction all the grounds of this reluctance, but there may be added to the sentiment which makes the work-house detestable to the poor in England a special prejudice arising from caste. A person who leaves his village and seeks alms may be supposed not to be particular as to the caste of the giver of food to him, and he is judged, therefore, to have become impure in his caste. In the poor-house his food may have been distributed by a Brahman, but he begged; did he receive food from Brahmans only?"

Captain Pitcher reports that—

*Para.* 72. "Everywhere I found in the villages the practice of excommunication from caste resorted to by all castes, except sweepers and 'Chammar Chamars,' against those people who went to the poor-houses. Instances may be seen in my diary of families found by me as living out of caste among the following:—Ahirs, Kurmis, Jolahas, Koris, Kahars, and even 'Jatya' Chammars; while, for the most part, the people who had returned had done nothing but beg ever since, and a very large proportion had died since their return. I found many instances of people who had gone to the poor-house, and after staying there some time returning of their own election to die at home. I am sure that inspection of the returns, when faired out, will convince any one that the poor-houses had very little effect in mitigating the mortality of the rural classes."

*Para.* 84. "Poor-houses will never be more popular than they are now until Chamars and Bhangis are relegated to separated enclosures. In the villages the Chamars have a perfectly separate quarter, and the sweeper a perfectly separate house, for the Chamar holds himself superior to the sweeper. No one who has not been on foot through many villages can appreciate the utter loathing and dislike entertained by the rest of the village towards the Chamars. I found Musulmans sharing this feeling as well as Hindus, and I often found all the people who could do so slink off when I came to enumerate the Chamar families. At the same time, having seen the demoralization of those who have been to poor-houses, I am convinced that to render the poor-houses more popular is simply to increase pauperism, and that all measures should be tried which would keep people at their homes. There was far greater mortality in proportion amongst those who left their homes, whether for poor-houses, for relief-works, or to wander in search of friends or work. More than once people remarked—'Those who died of hunger were those who left their villages, while those who remained quietly at home survived.'"

As the Honourable Syed Ahmed Khan was the officer who (under Sir J. Strachey, then Magistrate and Collector at Moradabad) established and managed the famine poor-house at Moradabad in 1861, which has ever since been held to be the model for such institutions, and as neither in the history of the famine of 1861, nor in that of 1868, is there any record of such hostility being felt towards poor-house relief as is now reported, I drew his attention to the above quoted passages, and asked if he could suggest any explanation of this change in the popular feeling. In reply, he has favoured me with the following valuable memorandum.

10-6-79. C. A. E.

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1. I have perused the reports made by Messrs. Benett and Roberts, and Captain Pitcher, on the last famine. There cannot be given any decided opinion in regard to the unpopularity of those poor-houses in which cooked food is distributed, until it is known how they were managed. But these reports do not describe the character of the management.

2. The management of poor-houses is of course a difficult task, and their popularity or unpopularity depends, I think, to a great extent, on the character of such management.

At the time when Sir John Strachey was the Magistrate and Collector of Moradabad, the management of the poor-house at that station, which contained a large number of persons of every caste and sect, devolved on me. I am now going to enumerate the principles on which that institution was established. A comparison of those principles with the above-named reports, which dwell on the unpopularity of the poor-houses, will throw some light on the discovery of the real causes of that unpopularity.

3. The poor-house at Moradabad was established on the following principles:—

(1.) A committee was formed which consisted of respectable Hindu and Muhammadan members who used to select every morning and afternoon persons fit to be admitted into the poor-house, as well as those to be sent to the relief-works,[1] out of the lot that assembled every day. Persons selected for the poor-house were each given a ticket marked with a number, and ordered to sit in a separate quarter. Those appointed for the relief-works were given similar tickets and sent to work. Persons employed in the relief-works also received cooked food. As no arrangement could conveniently be made with regard to caste system at such relief-works, therefore those persons only who did not mind caste restrictions, and who were somewhat strong and healthy, were ordered to such works.

(2.) Persons selected for admission into the poor-house had to present themselves immediately before the said Committee to undergo a sub-division with regard to the variety of castes. (I.) The *Bhangis* (sweepers), for instance, who are hated and disliked by persons of all other castes, were enrolled in a separate register; (II.) the *Chamars* and their cognate class, the *Chamar Kolis*, were entered in another; while (III.) the *Musalmans*, and those of the *Hindus* who declared that they had sought alms and received food from every person without regard to caste, and that they no longer observed the caste system, were put in a third register, though these latter would have no objection at all had they been placed into the company of the *Chamars* even. (IV.) Those Hindus who were particular about caste were enrolled in a fourth register.

(3.) The poor-house which was established in a spacious garden was divided into two separate enclosures. The larger of these enclosures was assigned to the first three classes named above, and the smaller one to the fourth and last class.

(4.) The former of these enclosures contained a number of smaller areas enclosed by bamboos, spacious enough to receive 1,000 persons (or 500, the exact number I do not remember) sitting in four rows, one on each side, to take their food.

(5.) Separate areas were assigned to different classes and castes; as for instance, the area assigned to the *Bhangis* contained none but the Bhangis, that assigned to the *Chamars* contained none but the Chamars or Chamar Kolis, and that assigned to the Muhammadans contained none but the Muhammadans or those of the Hindus who had already renounced their caste. A separate register was kept for each area, and a clerk stood at the door, at the time when food was to be distributed, to let in those persons only whose names were enrolled in the register. These persons had become so accustomed as to seat themselves in their proper places with regard to numbers. There was only one kitchen for all these castes, and the bread, which was of a definite weight, was baked in ovens by Muhammadan cooks, and the number of breads allotted to each individual was marked in the register kept by the clerk. Proper arrangements were also made to have the bread and *dal* (or any other thing to eat with bread) distributed to persons in each area.

(6.) The second enclosure, which was assigned to the Hindus who observed the distinctions of caste, had a long barrack or kitchen built into it. The management of this kitchen and the distribution of food belonged to those members of the committee who were respectable Hindus. Some of these members were Government servants, such as Munsiffs and Sadar Amins, and others were some of the respectable Hindu residents of the city. These members used to enquire about the caste of the persons taken into the enclosure, and could do this very easily. Arrangements made within this enclosure are as follows:—

(*a.*) This enclosure contained a well, and proper arrangements were made for those Hindus who used to bathe before taking their food, according to their religious custom.

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[1] By relief-works I mean those works (on roads) which were opened at a very short distance from the city of Moradabad, on the banks of the Ram-Gunga, with the mere object of supporting the paupers.

(*b.*) Separate *Chaukas* (dining grounds) were provided for each class of those people who had no objection against taking their food in the same *Chauka* with other members of that class or caste. This *Chauka* was so made as to be contiguous to the place where their food was cooked, and was very easily prepared, simply by sprinkling water over the ground, and then drawing four lines, one on each side.

(*c.*) These Hindus almost wholly consisted of persons who had no objection as to taking food cooked by the Brahmans who were appointed by the Hindu members. They received their food cooked by these Brahmans within the precincts of their *Chaukas*, which were wide enough not to render the food impure on the score of its happening to come out of the *Chauka*, conformably to their religious ordinances.

(*d.*) There were some persons, though very few indeed, who objected to take food cooked by any other person but one of their own caste. Such persons were separated from the rest, and permitted to prepare their food themselves jointly in a separate *Chauka* within the same enclosure. Their shares of flour, dal, and fuel were of course given to them.

(*e.*) There were, moreover, persons (though rare) who were so prejudiced and superstitious as not to touch food cooked by any other person but by their own hands. Such persons were each allotted a separate quarter for making their *Chaukas* within the same enclosure.

4. These were the only arrangements connected with their food. There does not seem any necessity for mentioning those relating to their living and their employment in the poor-house, their medical treatment, their bathing, and the change of their clothes. Such a management can never be expected to give birth to complaints mentioned in the above-named reports.

5. There is no doubt that the class of persons who have already been ex-communicated before they set their foot into the poor-house will never regain their caste after leaving the poor-house. When I was sent to take charge of the poor-houses at Gorucknpore and Basti, I found that almost all the Hindus then attending the poor-houses had been previously excommunicated, and that they did not mind the restrictions of caste, and had no objection against food, by whomsoever it might have been prepared, although the food they received in the poor-houses was cooked by Brahmans. The reports do not make any mention as to the fact whether the persons said to have lost their caste had been excommunicated previous to their entering the poor-house or not.

6. I am now going to take a glance at the reports. The difficulties arising from the caste distinctions of which Mr. Benett speaks in paragraph 54 of his report might well be removed by a management similar to that at Moradabad, described above.

7. The statement made by Captain Pitcher in paragraph 72 of his report, regarding the excommunication of persons admitted into the poor-houses, does not show whether their caste had remained unsullied at the moment they had entered the poor-houses, and whether the poor-houses were managed according to the caste system adopted at Moradabad. From paragraph 84 of the same report it appears that this was not the case, as he states there that "poor-houses will never be more popular than they are now "until Chamars and Bhangis are relegated to separate enclosures," which shows undoubtedly that they were not made to sit separately.

8. I cannot understand that "to render the poor-houses more popular is to increase "pauperism," nor do I see any other way of helping people which may prevent pauperism. The suggestion that persons should not be drawn out from their homes, and that succour be given to them at their homes, is pleasing to the ears, but I do not think it possible to bring it practically into effect, nor can relief-works be opened everywhere near the homes of the villagers.

9. With reference to paragraph 94 of Mr. Roberts' report, about the reluctance on the part of the people to avail themselves of the poor-houses for fear of the loss of caste, I would make the same remark as I have done in the case of Captain Pitcher, with the addition that the statement made by Mr. Roberts that "the poor-houses were largely "recruited by starving wanderers whom the police compelled to come in," gives much reason to believe that the inmates of the poor-houses were for the most part those persons who had already lost their caste by begging in from door to door.

10. No measure whatever that may be adopted for giving relief to people in a famine is free from its attendant defects, notwithstanding its manifold benefits, and a manager is necessarily inclined to weigh those defects and benefits, and adopt the one in which the latter prevail. On this principle I must own that the establishment of the poor-houses is not faultless just as any other measure is not so.

11. The evil which results from the distribution of money or of raw materials of food to the paupers is, that they often choose to lay it by and live on a very bad and unwholesome sort of food, which increases disease and mortality. I have myself occasionally found out persons in a poor-house who had got pice, cowries, flour, and corn with them. They might have collected these things by begging, but they would not spend them, and chose to live on very revolting things which they picked up from the earth rather than part with their stores. The food which they received in the poor-house was good, and it could not produce such bad effects. Another difficulty in distributing money (supposing that they will spend it in feeding themselves) is that they will not sufficiently be able to make arrangements for their food separately, as separate arrangements require greater expense. There are, moreover, many persons who are in some way or other incapable of making arrangements for their food themselves, and the supply of cooked food to them is considered to be the greatest boon.

12. Arrangements were also made at Moradabad for washing the persons of the paupers and for changing their corrupt and noisome clothes, which was indeed considered as a precaution against the spread of disease.

13. Poor-houses do certainly check or rather put a stop to that practice of embezzlement and fraud which attends the distribution of cash money, even when given to labourers on the relief-works. While at Goruckpore, I came to the knowledge of everything connected with the relief-works where thousands of paupers were employed on a road near a celebrated bridge and on a tank. After trying every means I could not see how to put a stop to such malpractices. I once happened to meet a man who was distributing wages to his party, and asked him how he knew that all these persons belonged to his party, and that he distributed the money justly, and gave every one the exact amount due to him. He replied that I could not understand such things until I performed the work myself. Giving the lowest value to my estimate, I can, with confidence, say that one-fourth of the amount is embezzled in the distribution of cash money, whether in relief-works or anywhere else.

14. There were, however, various kinds of work performed at the poor-house at Moradabad, such as the spinning of cotton, the weaving of cloth, *durries*, and blankets, and the twisting of ropes, &c. These articles, when prepared, were sold to defray a portion of the expenditure incurred in supporting the paupers. A third part probably (I do not recollect the exact amount) of the whole expenditure was thus repaid, and was, from time to time, added to the relief fund, so that we were thus able to support four thousand persons (for instance) by a fund which was originally capable of supporting three thousand persons. Quite contrary was the case of cash distribution by which we should have hardly been able to support three thousand persons by a fund which would have well sufficed for the support of four thousand persons.

15. There is no doubt that the poor-houses are liable to some defects, such as—

(1.) Defects in management. As I have often heard of mismanagement in most of the poor-houses that were opened during the last famine, I am inclined to conclude that a poor-house and mismanagement are closely connected with one another.

(2.) It is undoubtedly a fact that the higher classes of people, whether Hindu or Muhammadan, and particularly the women who have the slightest claim to respectability, consider it a great disgrace to go to a poor-house, and it is not strange that some might have preferred starvation to that disgrace. If I am not mistaken, the same feelings may have been entertained in Europe with regard to the poor-houses. But this does not incline us to regard the poor-houses as defective, but to make some other arrangement for this sort of people.

At Moradabad two plans were adopted to meet this difficulty. In the first place, a certain quantity of cotton was every week sent to the women at their houses with an amount of money sufficient to maintain them during that week. They had to spin the cotton and then send it back to the managers of the poor-houses Although the persons charged with the distribution of these things were selected

from among trustworthy persons, yet I doubt not that some irregularities occurred in the matter. In the second place, men who felt a shame in entering the poor-house like other paupers were nominally taken into employ on small salaries in the poor-house or relief-works, though there was in reality no need of their services. This measure did not, however, prove thoroughly effective. The abundance of the servants had of course the effect of ensuring a satisfactory management of the poor-house and the relief-works.

(3.) The people certainly do not like to leave their homes for poor-houses as long as they can support themselves in some way or other. It was, in my opinion, one of the foremost principles we had in view in the management of the poor-houses (whether I was right or wrong I do not know) that those persons should only be admitted into a poor-house who could not support themselves in any other way. Hence the failure of those persons to join the poor-house, who could in any way support themselves at their homes, was considered by us as the attainment of one of the best principles.

16. In conclusion, I beg to state that I never heard that persons of the fourth class above mentioned, who had got a separate enclosure for taking their food in the poor-house at Moradabad, were ever excommunicated. The state of management of a poor-house is soon rumoured abroad, and the effect which the good or bad state of its management has had on the continuance of a person in, or his exclusion from, his caste may thus have been known to the people.

SYED AHMED.

9th June 1879.

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## MYSORE.

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This sketch is compiled (by Mr. C. Campbell of the India Office) from Mr. C. A. Elliott's Report on the Mysore Famine.

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*Causes of Famine.*—In 1875 the rainfall was extremely scanty. The early rains were light, and the autumn rains entirely failed, the result being a very short crop of the autumn dry grains, and an entire failure of the winter rice. The country, however, was in so prosperous a condition at the time that, though much anxiety was felt and preparations for relief were made, no real distress ensued. The rainfall of 1876, however, was even more deficient than that of 1875. The S.W. Monsoon was very light, whilst the N.E. monsoon failed entirely. The dry crops came to nothing, and the tanks and wells being exhausted through the drought, the late rice crop also was a total failure.

The effect on prices of these bad seasons was that ragi, the staple food grain of the province, had risen by November 1875 to 22½ seers per rupee, or more than double the usual price, to 18 in August 1876, and to 6½ in December.

*History of the Famine.*—As soon as it was clear that the failure of the rain had been general and must produce a wide-spread loss of food, preparations were made to open relief-works, and at the close of October[1] the Chief Commissioner laid down the system on which he proposed to administer relief measures. This system embraced the digging of wells and the encouragement of irrigation by lowering the rates of assessment, strengthening the police and the district establishments by closing the civil courts and utilising their staff; but he demurred to the proposal to supply famine labour on the railway to Mysore, or on any large works, as well as to any scheme for buying grain or interfering with trade. The Government of India approved these instructions and accorded their emphatic approval[2] to the system of carrying on minor works at numerous places, instead of concentrating large bodies of labourers on works at a distance from their homes. However, with regard to gratuitous relief, the old principle was adhered to, that it was mainly the duty of the community to assist those who were unable to work, and on the 2nd November[3] the Chief Commissioner called a public meeting at Bangalore, at which subscriptions were invited, an equal sum being promised by Government, and a Central Committee for administering this relief was appointed.

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[1] R., p. 24–5. [2] R., p. 26. [3] R., p. 26.

This Committee continued its functions in the town of Bangalore till the end of September 1877. Similar measures were adopted in other large towns, and where private charity failed Government stepped in. Early in February[1] Sir R. Temple, the famine delegate from the Government of India, visited Mysore. His report on the general condition of the people at the time was not unfavourable. He did not observe many cases of emaciation or any of starvation; it was known that there was some increase in the death rate, but the increase was attributed to cholera. He approved of the system under which "good useful work on irrigation tanks is being done at piece-work rates," and thought it unnecessary to begin any large work till the numbers of applicants increased. He considered that the economy with which relief operations were conducted in Mysore contrasted very favourably with Madras. The reform he chiefly urged was the introduction of a system of village inspection and house to house visitation, and a strengthening of the existing staff where necessary; and some subordinate officers were detailed to this work, but it was neither efficiently carried out by them, nor effectively supervised by the superior staff.[2] Towards the end of February cholera in a severe form broke out and continued to rage with great violence till June. The mortality was very great in the relief kitchens, where the sick and infirm had no chance of escape; when it broke out in the works it had the effect of dispersing the gangs.

In the beginning of April[3] Sir R. Temple revisited Mysore. He still continued to take an optimist view of the situation, and considered that the results of the relief administration still compared favourably with the neighbouring districts of Madras, even after all the economy and reduction which had been introduced into those districts, and that the labourers on relief-works were in fair condition. At the end of March through want of proper arrangement and system the numbers on civil relief-works fell from 55,687 in the last week of March[4] to 32,000 in the first week of April, and never recovered; the numbers in receipt of gratuitous relief simultaneously rising gradually from a monthly average of 43,600 in March to a maximum of 227,067 in August.

This period was one of extreme depression and of gloomy forebodings that the monsoon would fail again. After a cyclonic fall of rain in May the rainfall was extremely light through June, July, and August, and it was during these months that the distress and mortality reached their climax. The loss of cattle, too, owing to the want of pasture, was very great. On the 1st September agriculture was at a standstill and all field labour was stopped; the starving people, finding that the relief-work did not provide them a sufficient or a certain subsistence, crowded into the large towns, and especially to Bangalore, in such numbers as to swamp the machinery for distributing gratuitous relief, and died in large numbers in holes and corners of the town. Rain began to fall and continued throughout the month. On the 6th the Viceroy arrived at Bangalore, and on the 8th he addressed a letter to the Chief Commissioner in which a scheme for reorganising the whole system of famine management was delineated, a chief feature of which was the appointment of a Famine Department presided over by Mr. C. A. Elliott as Famine Commissioner, with Mr. Wingate as Famine Secretary. As it was further considered necessary to make a radical change in the system of relief-works, Col. Sankey was relieved of his post as Chief Engineer, and Major Moncrieff appointed in his place. Under the new central authority a Famine Code was drawn up and uniformity introduced into the relief arrangements; gratuitous food was confined to those who were altogether unable to labour, and was given for the most part subject to the condition of residence in a poor-house; while everyone who was able to do any work, however little, was employed on relief-works. These were almost without exception large works of permanent utility, and were placed under officers of the Public Works Department. The establishment employed in administering famine relief was largely increased, and an active system of house to house inspection of the villages was set on foot, with a view to relieving at home those who were infirm and feeble, and to stimulating all others if in distress to seek employment by work. The numbers on relief-works at once rose, the monthly average in November being 75,850. The intensity of the distress was now however past, for the rain gave fresh life to agricultural occupations, and the spontaneous produce of grasses and weeds was collected with avidity by those who could not get work. The harvest in December 1877 and January 1878 had the effect of still further decreasing the numbers to be relieved. In February and March they increased again, but in May the rice harvest dispersed the gangs, who were encouraged by the seasonable weather to plough and sow their fields. Simultaneously with the increase on relief-works the numbers in receipt of gratuitous relief decreased, so that at the beginning of 1878 the relief camps were little more than hospitals. By

[1] R., p. 36. [2] R., p. 40. [3] R., p. 60. [4] R., p. 74–5.

the end of May all danger was past, and the famine establishments were at once reduced.

3. *Relief-work.*—During the earlier period of the famine the system of relief-works pursued was, with few exceptions, that of carrying out numerous small works such as repairs to tanks and metalling of roads, which were conducted under the orders of the district officers. The undoubted utility of these works secured at first the sanction of the Government of India, and the system was also approved by Sir R. Temple, on the understanding that large works were ready, should the necessity for them arise. The works were of a kind which were ordinarily conducted by the district officers, and as such were well suited for their purpose. The method, however, under which they were planned was cumbrous and the system of granting money uncertain. Certain sums were allotted to a district, and distributed to the taluqs according to their needs.[1] None of the money could, however, be touched till it had been definitely appropriated to a particular work, estimates drawn up, and sanction obtained from the Commissioner or Chief Commissioner according to the amount. The district officers in practice had no time to comply with all these forms, and the work was badly carried on through lack of supervision, money ran short for want of the necessary sanction having been obtained, and works had to be closed, and reopened capriciously. The people were thus discouraged and prevented from coming to work. But the final cause of the collapse of the system was an oversight which arose out of the routine observed in all the earlier famine procedure. A rule of the Public Works Department had been adopted to the effect that all grants not fully utilised before the close of the financial year should lapse. No arrangements were made to withdraw it, when it was seen that the necessity for relief-works would continue. Consequently the works were closed, and the district officers, with no power to assist, were surrounded by starving wretches howling for employment, who were thrown out of work by the sudden cessation of funds. Though measures were at once taken to remedy the mistake, the people were thoroughly disgusted with the fitful nature of their employment, and the works were never again put on a proper footing till the new arrangement ordered by the Viceroy came into force in September 1877. The consequence was an immediate falling off in the numbers on relief-works from 55,687 in the last week of March to 32,000 in the first week of April, and from thenceforth they oscillated from that figure to 25,000.

The unsteadiness of the attendance at the Civil Relief Works, owing to the above-mentioned reasons, may be best seen by the following table:—

| Month. | Average No. on Civil Relief Works. |
|---|---|
| January | 20,870 |
| February | 37,830 |
| March | 41,730 |
| April | 29,730 |
| May | 30,010 |
| June | 28,060 |
| July | 26,300 |
| August | 26,000 |
| September | 29,970 |

The Public Works Department were also enjoined to co-operate with the district officers, but co-operation was never hearty. Their system was not altered to suit the altered circumstances. The work was done by petty contract and the labourers paid on the piece-work system at ordinary rates, which were insufficient to enable those unaccustomed to work, especially when emaciated by famine and illness, to earn a living. Again in many cases the labourers were only paid once in 15 days. Consequently the works conducted by the Public Works Department did but little towards relieving the famine.

An attempt was made in the latter end of July to put matters on a better footing, and proposals were made with the view of establishing a system of large relief-works and placing them under the control of the Public Works Department, and relieving the overworked district officers of this portion of their duties. It was also suggested that, whereas a larger sum of money was being spent on gratuitous relief than on relief-works, the reverse ought to be the case. These views made a great impression on the Chief Commissioner; but as they were opposed by the Chief Engineer, and as in a conference summoned to consider them the divergence of opinion was so great that no decision could be come to, a proposal which might have saved much suffering to the starving people fell to the ground.

[1] R., p. 45, 50.

On the visit of the Viceroy in September 1877, the system which had proved so successful in Bombay was substituted. The main outlines of the system were that all relief-works should be large works of permanent utility and should be conducted under officers of the Public Works Department: and that all applicants for employment should be received on them. The labourers were classified according to their strength and ability to work and suitable tasks allotted to them; the wage was so arranged as to leave a slight margin for comforts over and above actual subsistence, and this margin, but no more, might be deducted as a penalty for idleness: the wage was paid daily at first and afterwards twice a week, under the supervision of competent officers. It was laid down that work should not be given to any near their homes, but in most cases this test was not enforced, as the severity of the famine did away with its necessity. The Public Works Budget was entirely revised and no work was undertaken which was not suitable for relief purposes.

The following statement gives the average numbers on relief-works, as far as the provincial returns contain the information each month from December 1876 to July 1878, the average monthly attendance for the whole period, and the total cost of relief-works:—

| Year. | Month. | Civil Relief. | P.W.D. Works. |
|---|---|---|---|
| 1876 | December | 15,000 | 20,000 |
| 1877 | January | 20,870 | 20,000 |
| | February | 37,830 | 28,780 |
| | March | 41,730 | 30,950 |
| | April | 29,730 | 31,500 |
| | May | 30,010 | 32,500 |
| | June | 28,060 | 26,800 |
| | July | 26,300 | 20,750 |
| | August | 26,000 | 22,600 |
| | September | 29,970 | 25,800 |
| | October | 30,200 | 44,000 |
| | November | 75,550 | |
| | December | 55,273 | |
| 1878 | January | 45,197 | |
| | February | 46,834 | |
| | March | 55,742 | |
| | April | 54,369 | |
| | May | 45,890 | |
| | June | 37,630 | |
| | July | 33,425 | |
| | Total | 1,069,290 | |
| | Average monthly attendance for 20 months | 53,470 | |
| | Total cost | Rs. 29,50,000 | |

4. *Relief wages.*—The first attempt at establishing a uniform scale of wages was made on the 15th November. A circular was issued, suggesting that the rate should not exceed $2\frac{1}{2}$ annas for a male adult, and $1\frac{1}{2}$ for a female. No positive orders were, however, passed on the subject till the 28th February. At that date a rate of grain-wage was fixed, in case grain payments were made, "which for the present should not "be done unless under exceptional circumstances." The rate was—

| | |
|---|---|
| For a man $1\frac{1}{2}$ lb. of ragi[1] | 6 pies condiments. |
| For a woman $1\frac{1}{4}$ lb. of ragi[2] | 3 „ „ |
| For a child under 14 $\frac{3}{4}$ lb. of ragi[3] | 3 „ „ |

At the then price of grain these wages were equal respectively to 2, $1\frac{1}{2}$, and 1 anna respectively. If prices grew dearer, wages were to rise proportionally. The rate of piece-work was at the same time laid down for relief-works at 1 anna 6 pies per cubic yard. The efficiency of these rules, however, was seriously impaired by their being only permissive, and they were not generally adopted in the Public Works Department works. On July 21st, however, the chief engineer issued a circular, authorising the

[1] R., p. 45. [2] R., p. 51. [3] R., p. 105.

reduction of tasks by 25 per cent. in special cases, sanctioning a sliding scale of wages on the basis of ⅔ seer of rice, with an extra allowance for condiments, for working men; ⅔rds of this amount for women, and ½ for children, and daily payments under certain conditions not stated. The instructions contained in the circular were not, however, uniformly carried out.

In the Civil Works, a similar sliding scale was introduced by a circular dated 8th August. But in neither of these orders was any explanation given how this principle of a daily wage could be reconciled with the prevailing system of piece-work. The Famine Code for the first time put the question on a uniform and practical basis. Definite rules were laid down regarding the classing of the labourers, and the amount of work, never exceeding 75 per cent. of an ordinary task, to be required from each class; also regarding the payments, the existing rate of wage being generally accepted, as fixed by the circulars of 21st July and 8th August.

5. *Piece-work.*—The question of piece-work versus task-work is one which occupied a prominent place in the re-arrangement of affairs consequent on the appointment of the Famine Department.[1] The theoretic objections to piece-work for famine-relief purposes are, (1) a skilful labourer may earn more than a bare subsistence, and thus the work prove too attractive, (2) coolies may be stimulated to work with too great vigour and thus the work may be completed before the famine is over, (3) if a piece of work is paid for in the lump it is impossible to ensure a fair distribution of the pay among those who shared in the work, (4) the strength and skill of famine coolies vary so much that it is impossible to apportion the rate so as to bear an equal relation in all cases to their ability to work.

The system had proved a failure under the earlier régime, when the rules of the Public Works Department were not sufficiently elastic to allow of special modifications, but it was tried on the State railway with unaltered rates of pay, and the practical conclusion drawn from the facts and experience gained was, that on all large works there should be a piece-work gang, to which all the able-bodied should be drafted, and as many others as might wish it; that the system should only be tried in places where the quantity of work can be easily estimated by the labourers themselves, and the rate remain unaltered for a long period; but that the attempt to carry on famine relief *solely* on a system of piece-work payments must necessarily result in failure.

6. *Gratuitous relief.*—The principle on which gratuitous relief was administered during the famine was that of co-operation between the public and the Government, the primary responsibility, both for raising the funds and for managing their distribution, being vested in the public. The idea of distributing cooked food to starving people was not an unfamiliar one in Southern India, and private endowed charities of this nature already existed in the Province. These were naturally utilised when the want began to be severely felt, but as the distress increased, these sources of charity were soon dried up. Grants had then to be made by Government in certain cases, and in others, as at Bangalore, the Government supplemented private subscriptions by an equivalent grant. Towards the end of January, however, private charity was almost exhausted, except at Bangalore itself, and the Government had to undertake the whole cost of the work. At Bangalore the administration of this relief was left entirely in the hands of the Central Relief Committee till they applied for Government supervision, a measure which proved very effectual in producing economy. One evil which attended this form of relief was the want of uniformity in the rations of food, and towards the end of March the Chief Commissioner prescribed a scale,[2] viz., for an adult 45 tolas (1⅛ lb.) of ragi flour or 40 tolas (1 lb.) of rice, with 3 pies worth of condiments, and for a child under 10, half that amount. Additional measures were taken in May for enforcing this regulation.

Those paupers, however, who did some slight work were allowed a larger, but undefined ration; a modification which caused great confusion, and gave great openings for fraud. The number of kitchens was a fluctuating one, but tended gradually to increase, and at the highest time there were as many as 151[2] of these institutions, a number which in default of any increase to the ordinary district establishment, proved fatal to all effectual supervision. In January the numbers who received food at these kitchens were estimated at about 15,000, but by the end of March they had risen to about 58,000, and from that time they went on constantly increasing. In August, owing to the increasing emaciation of the paupers in Bangalore, a higher scale of ration was introduced which had the effect of increasing the attraction of the paupers from a distance to that

[1] R., p. 140, 156–159. [2] R., p. 59.

city. The returns for the whole province give the numbers at this date in receipt of gratuitous relief as 227,000. After the visit of the Viceroy in September, the necessity for using the machinery of a voluntary committee in distributing relief in Bangalore no longer existed, and the whole system was centralised under the Famine Department, and the necessary reforms were at once taken in hand. In the new Famine Code distinct instructions were given for administering this form of relief, and separate duties were assigned to separate officers. The Medical Department was strengthened and regular rules issued to provide against undue harshness in the operation of the tests and to secure the proper working of the relief measures. A uniform scale of 1 lb. of ragi with pulse and condiments for adult non-workers, half as much for a child under 12, and 1½ lbs. for a working man was adopted. The open kitchens were reduced in number and converted into enclosed relief camps. The able-bodied were drafted to the relief works, and the infirm and sick to the relief camps.

The following statement gives the monthly average numbers in receipt of gratuitous relief from December 1876 to July 1878, the average numbers for the first 11 and last 9 months and the total cost of this form of relief:—

| | | |
|---|---|---|
| 1876. | December | 15,000 |
| 1877. | January | 20,000 |
| | February | 25,000 |
| | March | 43,600 |
| | April | 69,570 |
| | May | 103,400 |
| | June | 114,100 |
| | July | 145,000 |
| | August | 199,300 |
| | September | 179,490 |
| | October | 81,870 |
| Average for 11 months | | 90,575 |
| | November | 33,200 |
| | December | 15,000 |
| 1878. | January | 7,000 |
| | February | 3,700 |
| | March | 5,400 |
| | April | 10,200 |
| | May | 10,900 |
| | June | 12,200 |
| | July | 13,000 |
| Average for 9 months | | 12,300 |
| | Total cost | Rs. 31,25,000. |

7. *Emigration and wandering.*—Closely connected with the subjects of relief-works and gratuitous relief are the questions of emigration and wandering. In the earlier months there was a great influx from Mysore into the adjoining Madras districts of Bellary and Cuddapah on the N. and N.E. and the Nilgiris on the S.W.; and a considerable controversy arose between the two administrations as to the method of dealing with the question. The Madras Government demanded from Mysore a contribution towards the relief of the immigrants, which the Mysore Administration refused on the ground that the migration was caused not by any deficiency of relief in Mysore, but by the high rate of wages given in Madras, which tempted away persons who were not in need of relief; and this contention received confirmation from the fact that on the assimilation of the rate of wages in Madras to that in Mysore the stream of emigration was almost entirely checked. In the meantime, however, a system of forcible deportation was adopted, which led to great confusion and trouble.

The ordinary immigration of coolies into the coffee districts of the Wynad also very much increased in 1877, and the planters, while they complained of the influx of weak and sickly people, dreaded lest any order prohibiting immigration should deprive them of their ordinary supply of labour. The district officers attempted to check it by selecting those who seemed sickly or feeble and relegating them to their homes in carts; but this was very unsuccessful. After the Viceroy's visit it was decided not to

prevent migration, but to provide relief at the places, where it was needed by opening relief-works and hospitals: and this was done in Courg and the Wynad with fairly good results. Wandering villagers also throughout the period of distress constantly found their way to the large district towns, partly impelled by a natural instinct to resort to the district centres, and partly attracted by the prospect of a gratuitous distribution of food. In order to check this evil a system of relegating them back to their homes was arranged in March 1877. Roadside stations were established which were intended to intercept the villagers, and to be depôts to which they might be sent from the large towns, and from which they might be forwarded to their homes, after receiving an allowance of uncooked food. In practice, however, the system was a failure. It was impossible to force the villagers to go home against their will, or, if they did go home, to stay there. The people were very loth to go and escaped from their escorts on all sides.

Under the reformed system, all attempts at "relegation" were abandoned, the rule being laid down that all persons in need of relief should be treated in the same way, from whatever country they might have come.

*Charitable relief.*—The sum of Rs. 16,53,900 was apportioned to Mysore by the Madras Government out of the subscriptions received from England and the Colonies for the relief of famine in the South of India. The money was administered by the Central Committee, who distributed it according to the best information they could get regarding the relative necessities of the various talugs. It was at first expended partly in hospital necessaries, and partly in clothes, but this latter form of relief fell into disrepute and was discontinued. However, the experience of a month established the principle, that the main use to which the money should be put was to restore the people to their ante-famine condition by providing them with implements and bullocks. The money was not to be frittered away in small gifts, but each man was to receive sufficient to give him a new start in life. Another use to which part of the subscriptions was applied was to establish orphanages and other charitable institutions, and the amount of good done to the people by these means is almost incalculable.

8. *Crime.*—A very serious feature of the famine times was the increase of crime. The average number of crimes (dacoity, robbery, burglary, and theft) before the famine was only about 25 per month. The increase during the famine months may be seen from the following table:—

| District. | Average monthly Number. | | | | Average monthly Number of Arrests. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. to Aug. 1876. | Sept. to Dec. 1876. | Jan. to March 1877. | April to Aug. 1877. | Sept. to Dec. 1877. | Jan. to Aug. 1876. | Sept. to Dec. 1876. | Jan. to March 1877. | April to Aug. 1877. | Sept. to Dec. 1877. |
| Bangalore | 20·25 | 105·50 | 173·00 | 264·2 | 203·00 | 21·60 | 104·50 | 222·0 | 425·4 | 365·00 |
| Kolar | 38·75 | 84·00 | 204·00 | 365·2 | 214·20 | 52·60 | 307·00 | 348·0 | 602·0 | 327·00 |
| Tumkur | 14·50 | 65·50 | 73·00 | 113·2 | 94·50 | 15·50 | 157·50 | 196·0 | 292·0 | 277·00 |
| Mysore | 50·00 | 64·50 | 54·30 | 135·2 | 193·00 | 39·00 | 41·25 | 45·0 | 166·8 | 275·00 |
| Hassan | 22·10 | 33·50 | 97·30 | 162·4 | 164·75 | 31·10 | 98·75 | 138·3 | 174·0 | 212·25 |
| Kadur | 23·00 | 28·00 | 22·30 | 66·4 | 87·00 | 53·10 | 116·25 | 58·3 | 122·2 | 180·25 |
| Shimoga | 30·60 | 34·75 | 38·60 | 98·4 | 54·75 | 41·00 | 35·00 | 47·3 | 178·2 | 109·00 |
| Chitaldrug | 18·10 | 40·25 | 105·00 | 212·2 | 97·75 | 57·10 | 135·20 | 212·6 | 396·8 | 180·75 |
| Total | 217·60 | 456·00 | 767·50 | 1416·2 | 1105·2 | 311·00 | 995·00 | 1267· | 2357· | 1926· |

During the height of the famine, lawlessness and insecurity of life prevailed to such an extent that whole hamlets were deserted, and the inhabitants flocked into the larger villages for security. The waste which resulted was terrible. Flocks of sheep were killed, and the greater part of the meat wasted. Ragi pits were plundered, and the greater part of the valuable stock scattered on the ground. The roads, however, were patrolled by the police, and were never rendered impassible.

9. *Area, Population, and Extent of Distress.*—The area of the 38 taluqs most severely affected by famine was 15,249 square miles, with a population according to the Census of 1871 of 2,673,198. In addition to these the distress was severe, though not intense, in 13 taluqs, the acre of which amounted to 3,840 square miles, and the population to

1,184,288. The western hill districts, moreover, though not directly affected by the drought, suffered considerably not only from the rise in prices, but from the influx of starving people from the eastern districts. Thus, the whole area of the Province (27,078 square miles) with its population of 5,055,412 souls was to a greater or less extent involved in the calamity. The following is the official estimate of the extent of the distress :—

| | Taluqs in which the Produce was as compared with an average Crop. | | | |
|---|---|---|---|---|
| | ½ and over. | ½ to ¼ | ¼ to ⅛ | ⅛ to Nil. |
| Bangalore | — | 1 | 7 | 1 |
| Kolar | — | 3 | 7 | — |
| Tumkur | — | — | 4 | 4 |
| Mysore | 7 | 3 | 1 | — |
| Hassan | 3 | 3 | 3 | — |
| Kadur | 3 | 1 | 2 | — |
| Shimoga | 5 | 1 | 2 | — |
| Chitaldrug | — | 1 | 5 | 2 |
| Total | 18 | 13 | 31 | 7 |

The conclusion drawn from these figures is that, assuming that half the average harvest would be sufficient to avert famine, the food-crop this year was only sufficient to feed 3¼ out of the five millions of the population. Out of the remaining 1¾ millions, a quarter of a million may be taken as representing the number who emigrated to the coffee districts; there would therefore remain to be provided for, either by imports or by the existing food stocks in the country, no less than 1½ million people.

The following table gives the average rainfall for each month for the 30 years, and the registered average rainfall in the Province in the years 1876 and 1877 :—

| | Average for 30 Years. | 1876. | 1877. |
|---|---|---|---|
| March | 0·65 | 1·12 | — |
| April | 1·48 | 1·17 | 1·80 |
| May | 5·06 | 2·98 | 8·19 |
| June | 3·21 | 2·44 | 3·84 |
| July | 3·71 | 4·17 | 1·75 |
| August | 6·11 | 2·97 | 1·22 |
| September | 6·33 | 1·86 | 6·56 |
| October | 5·81 | 0·59 | — |
| November | 1·67 | 0·36 | — |
| December | 0·81 | 0·0 | — |

10. *Trade.*—The stores of grain at the commencement of the famine had been much depleted, and very little from this source was thrown on the market, being for the most part reserved by the wealthier ryots for their own consumption, and hidden to save it from plunder. Consequently, the main dependence of the Government to supply the deficit in the stock of food was on trade; and the local merchants from the commencement of the scarcity showed great energy in carrying their grain wherever the demand indicated a likelihood of profit. The prices of ragi were 18 seers per rupee in August 1876, 14¾ in September, 10 to 11 in October, 8 to 9 in November, and 7 to 8 in December. Those of rice were 10 seers in August, 9 in September, 8 in October, 7 in November, and 6½ in December. After this period a slight fall in prices set in till the middle of May, 1871, when they rapidly rose. In September they began gradually to fall, and with some fluctuations maintained their downward tendency to the end. Meanwhile, the railway imported a steadily increasing amount of grain till the end of March. It slightly fell off during April, and rose again rapidly till August, with the exception of a slight falling off in June, owing to the deficiency in carrying power of the railway, and to the difficulty experienced by the smaller merchants in procuring transport, the larger merchants having obtained a practical monopoly of the railway waggons. This was to some extent remedied in July, with the result of a considerable expansion of trade. From September the imports gradually sank, as the prospects of the coming season

improved, and were only again stimulated in January by the rise in prices consequent on the revulsion of feeling which resulted from the failure of the ragi crop.

The total importations of grain by rail were as follows :—

| Year. | Month. | Tons. | Daily Average. Tons. |
|---|---|---|---|
| 1876 | November | 9,943 | 331½ |
| | December | 11,562 | 373 |
| 1877 | January | 11,259 | 363 |
| | February | 13,130 | 469 |
| | March | 15,282 | 493 |
| | April | 13,025 | 465 |
| | May | 14,542 | 519 |
| | June | 17,637 | 504 |
| | July | 19,151 | 684 |
| | August | 22,261 | 636 |
| | September | 17,093 | 610 |
| | October | 11,876 | 424 |
| | November | 17,189 | 491 |
| | December | 4,267 | 152 |
| 1878 | January | 5,719 | 204 |
| | February | 5,902 | 211 |
| | March | 8,848 | 253 |
| | April | 4,035 | 144 |
| | May | 5,473 | 156 |
| | June | 3,806 | 136 |
| | July | 5,179 | 185 |
| | Total | 237,179 | — |
| | Monthly average | 11,294¼ | — |
| | Daily average | 371¾ | — |

11. *Mortality.*—The mortuary returns of the Province are extremely incomplete, the average number of deaths returned scarcely ever exceeding 10 per mille in the four years from 1872 to 1875. In 1876 it rose to 10·7 per mille, and in 1877 it showed an immense increase to about 44 per mille. In 1878 the average fell again to about 14 per mille, the excess mortality in 1877 and 1878 as compared with the two preceding years being returned as 191,500.

The following statement shows the registered deaths by districts :—

| Districts. | Population. | Number of Deaths. | | | Ratio per Mille. | | |
|---|---|---|---|---|---|---|---|
| | | 1876. | 1877. | 1878. | 1876. | 1877. | 1878. |
| Bangalore | 828,354 | 8,958 | 47,468 | 10,624 | 10·8 | 57·3 | 12·8 |
| Kolar | 618,954 | 7,445 | 44,296 | 9,901 | 12· | 71·5 | 15·9 |
| Tumkur | 632,239 | 5,367 | 35,322 | 8,264 | 8·4 | 55·8 | 13· |
| Mysore | 943,187 | 7,019 | 27,212 | 10,957 | 7·4 | 28·3 | 11·6 |
| Hassan | 639,877 | 6,164 | 21,086 | 8,953 | 9·6 | 32·9 | 13·9 |
| Shimoga | 498,976 | 8,515 | 12,788 | 11,233 | 17· | 25·6 | 22·5 |
| Kadur | 362,465 | 4,144 | 12,366 | 6,492 | 11·4 | 34·1 | 17·9 |
| Chitaldrug | 531,360 | 6,653 | 22,494 | 7,346 | 12·5 | 42·3 | 13·8 |
| Total | 5,055,412 | 54,265 | 223,033 | 73,770 | Average 10·7 | Average 44·1 | Average 14·5 |

The true mortality, however, in ordinary years was probably about 35 per mille, and assuming that the rate of error in the returns was constant, the excess mortality in 1877–8 probably amounted to about 675,000. It is probable, however, that the returns for the famine years are even more erroneous than those for ordinary years, owing to disorganisation of the country and the circumstances of the returning officers. In the interval between the preliminary and final test census, in January 1878, it was shown that the rate of deaths amongst the stationary population (not including the wanderers) was 127·8 per mille, whereas the returns show a rate of only 44.

The most fatal month was August 1877, after which the mortality gradually declined from 25,965 to 5,551 in April 1878. From that point it rose again till it reached its second period of maximum in July 1878, when the registered deaths amounted to 6,921. After July it again declined till December, by which time it stood at about the level of the months before the famine.

The following statement shows the number of deaths, with the causes to which they were assigned :—

| Causes. | 1876. | 1877. | 1878. |
|---|---|---|---|
| Cholera - - - | 12,087 | 58,648 | 723 |
| Small pox - - - | 1,059 | 5,922 | 971 |
| Fevers - - - | 23,934 | 55,934 | 46,462 |
| Bowel complaints - - | 4,752 | 33,781 | 9,287 |
| All other causes - - - | 12,433 | 68,748 | 16,327 |
| Total - - - | 54,265 | 223,033 | 73,770 |

The most noticeable points in this connection are the great outbreak of cholera in 1877 and that of fever in October and November of the same year, both of which are believed to be largely attributable to the famine.

On the whole it is impossible to conclude that the excess mortality in the two years was less than 675,000, though the defectiveness of the returns makes any conclusions drawn from them somewhat doubtful.

12. *Test census.*—With a view to arrive at a clearer knowledge of the matter, a test census was taken on the night of 19th January, 1878, in a small division, of about 30 villages, in each of the talukas which had suffered most severely from famine. The work was done entirely by the superior officers, in order to insure accuracy. It was preceded by a preliminary census, and tested in every possible way, and was probably the most accurate ever taken in India. It was taken in 51 out of the 68 taluqs, and in 1454 villages. The total population discovered in these villages numbered 294,126. At the general census of 1871 they numbered 412,934—in other words the decrease was at the rate of 28·77 per cent.—which if applied to the whole province would give a total decrease, as compared with 1871, of 1,454,442, or assuming a normal rate of increase of population of $\frac{1}{2}$ per cent. per annum, 1,603,779. The test census of 1878 was, however, taken in all the worst taluqs, not in all the best; consequently, allowing for a better state of things in these taluqs, and for the absence of emigrants from their homes, who might be expected to return, the decrease may be reduced to about 1,300,000. There are, however, various other considerations which make an exact solution of the problem difficult, and an allowance of 5 per cent. should probably be made for possible error. One million one hundred thousand may then be safely taken as the minimum decrease of population, of which 50,000 may be due to diminished births, leaving a remainder of 1,050,000 as the actual number of deaths.

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# REPORT

OF THE

# INDIAN FAMINE COMMISSION.

## PART III.

## FAMINE HISTORIES.

Presented to both Houses of Parliament by Command of Her Majesty.

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